NATIONALGEOGRAPHIC.COM

NOVEMBER 2000

NATIONAL GEOGRAPHIC



Russia's Rugged Eden
Putorana Plateau 32

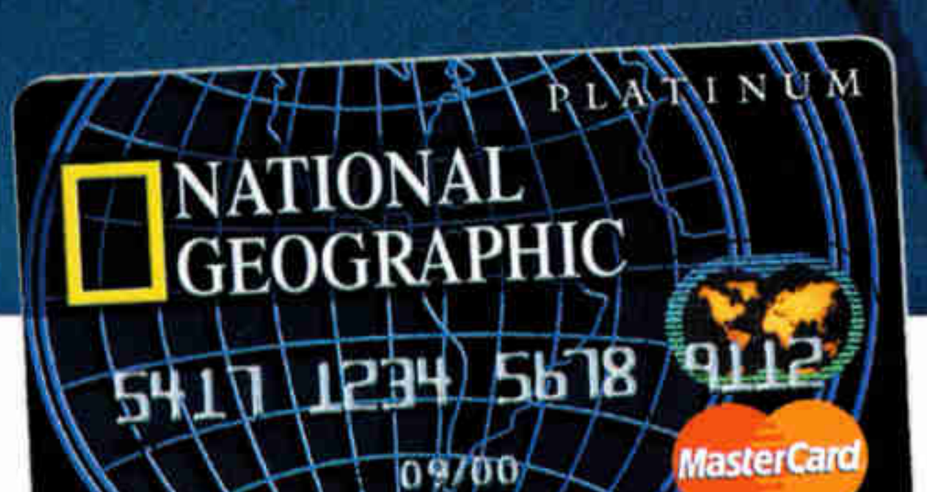
Inside the Volcano
Rappel Into Hell 50

90210
The Material Zip 126

LIBYA

An Inside Look After 30 Years of Isolation 2

FREE CARD REPLACEMENT IF LOST, STOLEN OR DEVOURED.



National Geographic Seal

2.9%
*Introductory APR with a balance transfer**

emergency cash & card replacement • lost luggage insurance
no annual fee • credit line from $5,000 to $100,000[1]
travel accident insurance[2] • purchases support the Society's vital programs such as environmental efforts, exploration, scientific research, and geography education.

*Offer subject to credit approval. If you transfer a balance with your application, the introductory 2.9% fixed APR on purchases and balance transfers will remain in effect for the first nine (9) billing cycles following the opening of your account. After that, a 12.99% fixed APR on purchases and balance transfers will be in effect. If you do not transfer a balance with your application, the introductory APR is not offered and the APR for all purchases and balance transfers will be 12.99% fixed. The APR for cash advances is 19.99% fixed. If payment is received late once during the introductory period, the APR on purchases and balance transfers will adjust to 12.99% fixed. If payment is received late twice during any 6-month period, the APR on all balances will adjust to 19.99% fixed. The annual fee: NONE. A minimum monthly Finance Charge is due. There is a Finance Charge for cash advances equal to 2% of the transaction amount with a $5 minimum. There is a Transaction Finance Charge for the purchase of wire transfer and money orders, the purchase of foreign currency and travelers checks from other than a bank and the use of convenience checks equal to 2% of the advance with a $10 minimum. There is a Transaction Fee for use of balance transfers, 3% of the amount of each balance transfer, but not less than $5.00. The lender on your account will be First USA Bank, P.O. Box 8658, Wilmington, Delaware 19899-8658. You should contact the Bank Service Center to obtain information of any changes after the printing date below by calling toll-free 1-800-537-6954. This offer is available only to applicants who reside in the United States. Print Date: 7/00
[1]In certain instances, you may receive a Standard card with a credit line up to $5,000. [2]Available to First USA Platinum MasterCard cardmembers only.

Photo By: David Doubilet

What's life without adventure?
What's adventure without
a little peace of mind?

With a very low APR, no annual fee
and a host of valuable benefits,
the National Geographic Platinum
MasterCard® is essential survival gear.

Equally valuable, your purchases
support the Society's mission, including
vital programs such as environmental
efforts, exploration, scientific research,
and geography education.

Choose from 8 compelling designs,
and gear up.



Arctic After Hours



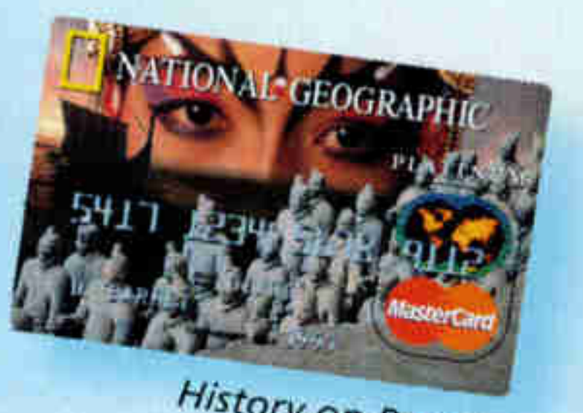
Grand Canyon Sunset



Capturing the Moment



Exotic Nature



History on Parade



Pyramids of Giza



Lionesses of Chobe

Look for a Brand New Cable Television Channel from National Geographic. Coming this Winter.

To apply, call 1·877·790·2615

Or apply online at ***www.ngstore.com***

"A prediction: *The [Meade] ETX-Autostar concept will go down as the greatest happening in amateur astronomy yet."* — *Sky & Telescope* magazine

Let Meade ultra-high-resolution optics take you on an automatic guided tour of the heavens. The rings of Saturn, the Orion Nebula, the Andromeda Galaxy, or any of 1400 other celestial wonders stored in the Autostar hand controller's database. Select an object, press GO TO, and watch as the ETX-60AT moves to the object, places it in the field of view, and tracks it across the sky — *automatically, first time, every time!*



Background photo by Jason Ware: the Andromeda Galaxy; Meade 6" Model 152ED telescope.

MEADE® ETX-60AT Astro Telescope

complete as shown with Autostar Hand Controller

— *$299*

Call **1-800-62-MEADE** for a free copy of Meade Telescope Catalog #120 or for a dealer location near you. Meade telescopes and accessories are available at over 3000 Meade dealer locations in the U.S.A. and Canada. Price listed is typical street-retail price in the U.S.A.

RITZ CAMERA 1 HOUR BIG PRINT
1-800-52-FOCUS
ritzcamera.com

THE NATURE COMPANY®
1-877-DCISTORE
discovery.com

STORE OF KNOWLEDGE
1-800-241-5858
storeofknowledge.com

NATIONAL GEOGRAPHIC SOCIETY
1-888-225-5647
nationalgeographic.com

Discovery CHANNEL STORE
1-877-DCISTORE
discovery.com

@YOUR service MERCHANDISE
1-800-251-1212
servicemerchandise.com

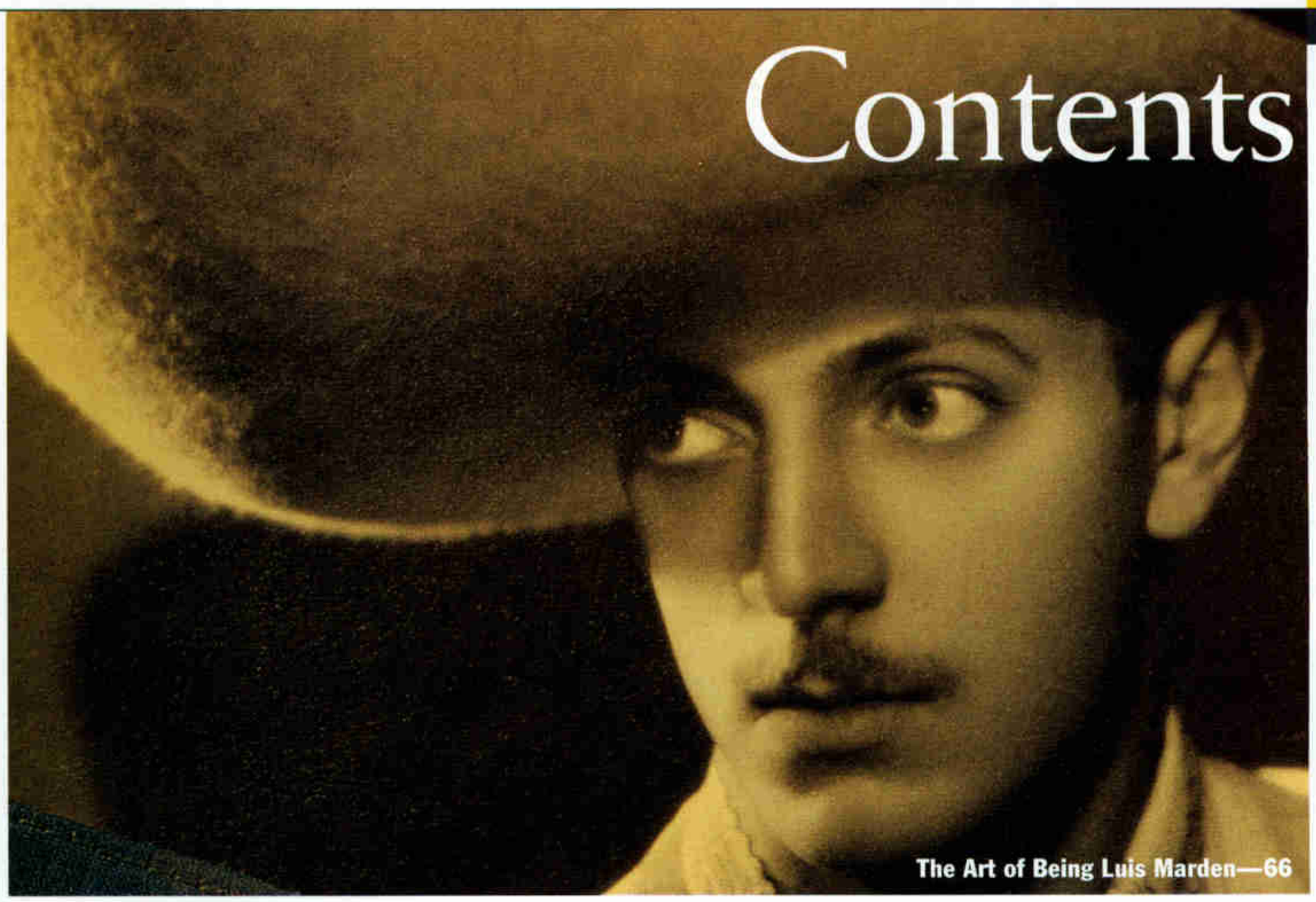
MEADE INSTRUMENTS CORPORATION 6001 Oak Canyon, Irvine, CA 92618. (949) 451-1450. FAX: (949) 451-1460. www.meade.com

The largest-selling telescopes in the world • A NASDAQ Company

©2000

VOL. 198 • NO. 5 • NOVEMBER 2000

Contents



The Art of Being Luis Marden—66

FEATURES

2 Libya After three decades of international isolation, the nation works to shed its outlaw image.
BY ANDREW COCKBURN PHOTOGRAPHS BY REZA

32 Putorana Plateau An expedition seeks Siberia's wild heart.
BY FEN MONTAIGNE PHOTOGRAPHS BY RANDY OLSON

50 Inside the Volcano A daredevil photographer leads a team of adventurers into an active volcano in the South Pacific.
BY DONOVAN WEBSTER PHOTOGRAPHS BY CARSTEN PETER

66 The Art of Being Luis Marden Writer, photographer, explorer: Luis Marden's 64 years with NATIONAL GEOGRAPHIC shaped the magazine.
BY CATHY NEWMAN MEMORABILIA PHOTOGRAPHS BY SARAH LEEN

84 Preying on Giants In Botswana a pride of lions lives large.
BY DERECK JOUBERT PHOTOGRAPHS BY BEVERLY JOUBERT

96 Nepal Gateway to the Himalaya, the nation struggles under its old burden of poverty and a new one—urban sprawl.
BY T. D. ALLMAN PHOTOGRAPHS BY MAGGIE STEBER

118 Pueblo Ancestors Return Home Ancient Native American remains are welcomed back to New Mexico after some 80 years away.
BY CLIFF TARPY PHOTOGRAPHS BY IRA BLOCK

126 ZipUSA: Beverly Hills Here, looks really *are* everything.
BY LISA BANNON STEINMETZ PHOTOGRAPHS BY LAUREN GREENFIELD

DEPARTMENTS

From the Editor
Forum
Geographica
Behind the Scenes
nationalgeographic.com
National Geographic TV
Ask Us

Final Edit
On Assignment
Flashback

THE COVER

The face of power—Muammar Qaddafi—watches over Libya. His portraits appear on billboards, in private homes, and on public buildings all across the country.

PHOTOGRAPH BY REZA

MORE INFORMATION

MEMBERSHIP Please call **1-800-NGS-LINE (1-800-647-5463).** Special device for the hearing-impaired (TDD) **1-800-548-9797.** Online: **nationalgeographic.com/ngm**

Cover printed on recycled-content paper.

From the Editor



REZA

Murder. Conspiracy to murder. The trial on these charges against two suspected members of the Libyan Intelligence Services allegedly responsible for the deaths of 270 people in the bombing of Pan Am flight 103 over Lockerbie, Scotland, in 1988 continues as this is being written. Even before the tragedy Libyan leader Muammar Qaddafi had been branded a supporter of international terrorism, his country shut off to many journalists and boycotted by much of the world.

For our cover story, NATIONAL GEOGRAPHIC received unprecedented access to this isolated land. Photographer Reza (above, with Qaddafi) and author Andrew Cockburn traveled to virtually every corner of the country to document the lives of ordinary Libyans.

Is Libya truly opening up? Has the boycott changed the policies of the Leader? Is the leopard changing his spots? We must wait for those answers. What we can do is give you the most thorough look inside Libya in many years and an objective glimpse of life in this closed society. Why the GEOGRAPHIC? While I would like to take the credit for this journalistic coup, that must go to NATIONAL GEOGRAPHIC's undisputed reputation for fairness and accuracy.

Bill Allen

NATIONAL GEOGRAPHIC MAGAZINE

WILLIAM L. ALLEN
Editor in Chief

ROBERT M. POOLE, *Executive Editor*
ROBERT L. BOOTH, *Managing Editor*

SENIOR EDITORS
DON BELT, *Exploration*
JUDITH BROWN, *Production*
WILLIAM T. DOUTHITT, *Special Projects*
JOHN A. ECHAVE, *Research Grant Projects*
RICK GORE, *Science*
DAVID JEFFERY, *Legends*
KENT J. KOBERSTEEN, *Photography*
JOHN G. MITCHELL, *Environment*
BERNARD OHANIAN, *International Editions*
OLIVER PAYNE, *Manuscripts*
CONSTANCE H. PHELPS, *Design*
LESLEY B. ROGERS, *Research*
W. ALLAN ROYCE, *Illustrations*
CHRISTOPHER P. SLOAN, *Art*
MEG NOTTINGHAM WALSH, *Departments*

EDITORIAL
Assistant Editors: Mike Edwards, Lisa Moore LaRoe, Peter L. Porteous, Joel L. Swerdlow, Jane Vessels. **Senior Writers:** John L. Eliot, Cathy Newman, Thomas O'Neill, Cliff Tarpy, Priit J. Vesilind. **Senior Editorial Staff:** Lynn Addison, Judith F. Bell, Carol B. Lutyk, Alan Mairson, Glenn Oeland, Jennifer Reek, Boris Weintraub, A. R. Williams, Margaret G. Zackowitz. **Editorial Staff:** Cassandra Franklin-Barbajosa, Glenn Hodges, Hillel J. Hoffmann, Karen E. Lange, Candice S. Millard, Lynne Warren. **Research:** Michaeline A. Sweeney, *Assoc. Director; Senior Researchers:* Alice J. Dunn, Kathy B. Maher, Barbara W. McConnell, Jeanne E. Peters, Abigail A. Tipton. *Researchers:* Elizabeth Connell, Michelle R. Harris, Patricia B. Kellogg. *Legends:* Victoria C. Ducheneaux, Susan A. Franques. *Planning Council:* Mary McPeak, David W. Wooddell

ILLUSTRATIONS
Photography: Susan A. Smith, *Asst. Director;* Sam Abell, William Albert Allard, Jodi Cobb, Chris Johns, Michael Nichols. *Studio:* Mark Thiessen. *Photo Engineering:* Lawrence B. Maurer. **Illustrations Editors:** Dennis R. Dimick, *Asst. Director;* Bert L. Fox, Todd James, Elizabeth Krist, Bruce A. McElfresh, Kathy Moran, Kurt F. Mutchler, Christopher Scaptura, Susan Welchman. **Design:** Robert Gray, David C. Whitmore, *Asst. Directors;* Elaine H. Bradley. *Typography:* Betty Clayman-DeAtley. **Art:** Jeffrey L. Osborn, *Asst. Director;* Christopher A. Klein, *Artist;* Darcy J. Bellido de Luna, *Research;* Carolyn P. Summerville. **Engraving and Printing:** Janet C. Evans, *Director;* George Bounelis, Judy L. Garvey, William D. Reicherts

EDITORIAL SERVICES
Administration: Neva L. Folk, *Asst. to the Editor;* Marisa Domeyko, *Staff;* Maria-Teresa Lawrence, *Business Manager;* Brian E. Strauss, *Electronic Publishing;* Sara L. Anderson, Sandra M. Dane, Luz Garcia, Artemis S. Lampathakis, Charlene S. Valeri. *Control Center:* Carol L. Dumont, *Director. Online:* Valerie A. May, *Director. Travel:* Ann C. Judge, *Director.* **Image Collection:** Maura A. Mulvihill, *Director;* William D. Perry, *Sales;* Carolyn J. Harrison, John A. Rutter. **Information Services:** Carolyn F. Clewell, *Director. Correspondence:* Joseph M. Blanton, Jr., *Director;* Carol Stroud, Lisa Walker. *Libraries and Indexing:* Susan Fifer Canby, *Director;* Ann C. Benson, Ellen D. Briscoe, Janet Dombrowski, Barbara P. Ferry, Anne Marie Houppert. *Records:* Ann E. Hubbs. *Translations:* Kathryn A. Bazo, *Director;* Sigrid Block. **Public Affairs:** Mary Jeanne Jacobsen, *Director;* Barbara H. Fallon, Barbara S. Moffet. **United Kingdom Office:** Jennifer Moseley, *Director*

PRODUCTION SERVICES
Hans H. Wegner, *Director.* **Pre-Press:** Geoffrey T. McConnell, *Director;* Martin G. Anderson, Clayton R. Burneston, Phillip E. Plude, Bernard G. Quarrick. **Printing:** Joseph M. Anderson, Edward J. Holland, Ronald E. Williamson. **Quality:** Bill M. Aldridge, *Director;* Peg M. Crawford

MAGAZINE PUBLISHING
Advertising: *Directors:* Andrea Vaughan, *National Sales;* Michel Siegfried, *International. Regional Managers:* Philip G. Reynolds, *Midwest;* Lori Friesner, *Detroit;* Ron Bottorff, *West;* Sherburne F. Naulty, *East;* John Patten, *New York;* Rainer Jenss, *Southeast.* Washington: *Directors:* Pandora B. Todd, *Marketing:* Margaret Robertson, *Operations;* Gail M. Jackson, *Production.* **Business and Finance:** *Vice President:* Sarita L. Moffat. **Circulation:** *Vice President:* Kitty Carroll Colbert. *Directors:* Elizabeth M. Safford, *North America;* John A. Seeley, *International.* **Member Services:** *Directors:* Christina C. Alberghini, *North America;* Myra A. McLellan, *International*



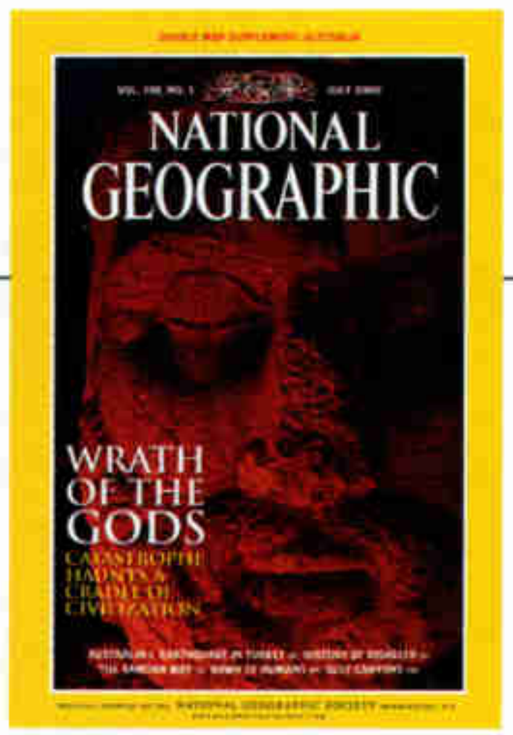
THE 2001 4RUNNER With Vehicle Skid Control (VSC) and available traction-enhancing systems like Active TRAC and Multi-Mode 4-wheel drive, the restyled Toyota 4Runner can take you almost anywhere. Which may require extra equipment.

www.toyota.com • 1-800-GO-TOYOTA

TOYOTA

©2000 Toyota Motor Sales, U.S.A., Inc. Buckle Up! Do it for those who love you. Toyota reminds you to Tread Lightly!®

Forum



July 2000

Readers of the July issue were moved by what one termed the "breathtaking coverage" on Turkey. A member from Malaysia wrote: "Your article on the life of the Turks after the quake was both heart wrenching and mind-boggling." Another said that the story "gave valuable insight into the terrible history of the region and the dynamics that create one of the world's most active tectonic areas."

Earthquake in Turkey

It might be of interest to note that the metaphor "wrath of God" was also used by the tenth-century Byzantine historiographer Leo Diaconus to describe the devastating earthquake that hit the city of Bolu, located on the North Anatolian Fault, in 967 [see maps on page 39 and pages 59-60]. It is easier to ascribe geologic catastrophes to vengeful gods that might be placated than to those merciless geologic forces you point out in the article.

FRIEDRICH BECKER-BERTAU
Hamburg, Germany

Rick Gore and Reza have described our earthquake in Turkey very well. Thanks for explaining—to today's generation and to future generations—what mistakes in construction can mean. Nature does not excuse human mistakes.

YAVER ZEYTINOĞLU
Popuelles, Belgium

I was disappointed to note the mistake in the caption on page 62. The large domed building on the right is Hagia Sophia, with its four minarets. The domed building on the left is the Blue Mosque, with its six minarets. Hagia Sophia and the Blue Mosque are often confused in photos; one can tell them apart by counting the minarets.

MARK DANIELS
Washington, D.C.

People Like Us

The real reason large animals are portrayed on flat surfaces is not to ensure the fertility of favored prey or to mark the artist's turf. It's much simpler: Dad points and says, "Kids, stay away from *this!*" or "We're leaving now, dear. We'll be home before sundown. Get the barbecue ready. We're bringing back one of *these.*"

DANIEL POHULY
West Mifflin, Pennsylvania

I wish to offer an interpretation of some of the items shown in the photograph on page 111. The disk has ten peripheral slots. The horse figurine has 50 holes: five on each leg and 20 on each of the two parallel curves. Surely this means these people had a base ten number system. The horse could have been a learning aid or a form of currency.

DAVID H. WEBSTER
Kentville, Nova Scotia

Whether hunting or scavenging mammoths, early humans would bring back only the soft parts in transportable pieces to

NATIONAL GEOGRAPHIC SOCIETY

"For the increase and diffusion of geographic knowledge."

The National Geographic Society is chartered in Washington, D.C., as a nonprofit scientific and educational organization. Since 1888 the Society has supported more than 6,500 explorations and research projects, adding to knowledge of earth, sea, and sky.

JOHN M. FAHEY, JR., *President and CEO*

Executive Vice Presidents
TERRENCE B. ADAMSON
TERRY D. GARCIA, *Mission Programs*
NINA D. HOFFMAN, *President, Books and School Publishing Group*
CHRISTOPHER A. LIEDEL, *CFO*
ROBERT B. SIMS, *President, Magazine Group*

BOARD OF TRUSTEES
GILBERT M. GROSVENOR, *Chairman*
REG MURPHY, *Vice Chairman*
JOAN ABRAHAMSON, WILLIAM L. ALLEN, THOMAS E. BOLGER, LEWIS M. BRANSCOMB, J. CARTER BROWN, MARTHA E. CHURCH, MICHAEL COLLINS, JOHN M. FAHEY, JR., JAMES H. GILLIAM, JR., JOHN JAY ISELIN, JAMES C. KAUTZ, J. WILLARD MARRIOTT, JR., FLORETTA DUKES MCKENZIE, PATRICK F. NOONAN, DENNIS R. PATRICK, NATHANIEL P. REED, WILLIAM K. REILLY, ROZANNE L. RIDGWAY, JAMES R. SASSER, B. FRANCIS SAUL II, GERD SCHULTE-HILLEN

TRUSTEES EMERITUS
Joe L. Allbritton, Owen R. Anderson, Frank Borman, Robert L. Breeden, Lloyd H. Elliott, George M. Elsey, William Graves, Caryl P. Haskins, Mrs. Lyndon B. Johnson, Laurance S. Rockefeller, Robert C. Seamans, Jr., Frederick G. Vosburgh

RESEARCH AND EXPLORATION COMMITTEE
Peter H. Raven, *Chairman;* John M. Francis, *Vice Chairman and Executive Director;* Richard S. Williams, Jr., *Vice Chairman;* Martha E. Church, H. J. de Blij, Linda Manzanilla, David Pimentel, Charles H. Southwick, John H. Steele, George E. Stuart, Hans-Dieter Sues, George E. Watson, Henry T. Wright

EXPLORERS-IN-RESIDENCE
Stephen Ambrose, Robert Ballard, Wade Davis, Sylvia Earle, Jane Goodall, Johan Reinhard, Paul Sereno

MISSION PROGRAMS
Education Foundation: Lanny M. Proffer. **Exhibits:** Susan S. Norton. **Expeditions Council:** Rebecca Martin. **Geography Bee:** Mary Lee Elden. **Lectures:** P. Andrew van Duym, Gregory A. McGruder

School Publishing: Ericka Markman, *Vice President.* **International:** Robert W. Hernández, *Vice President*

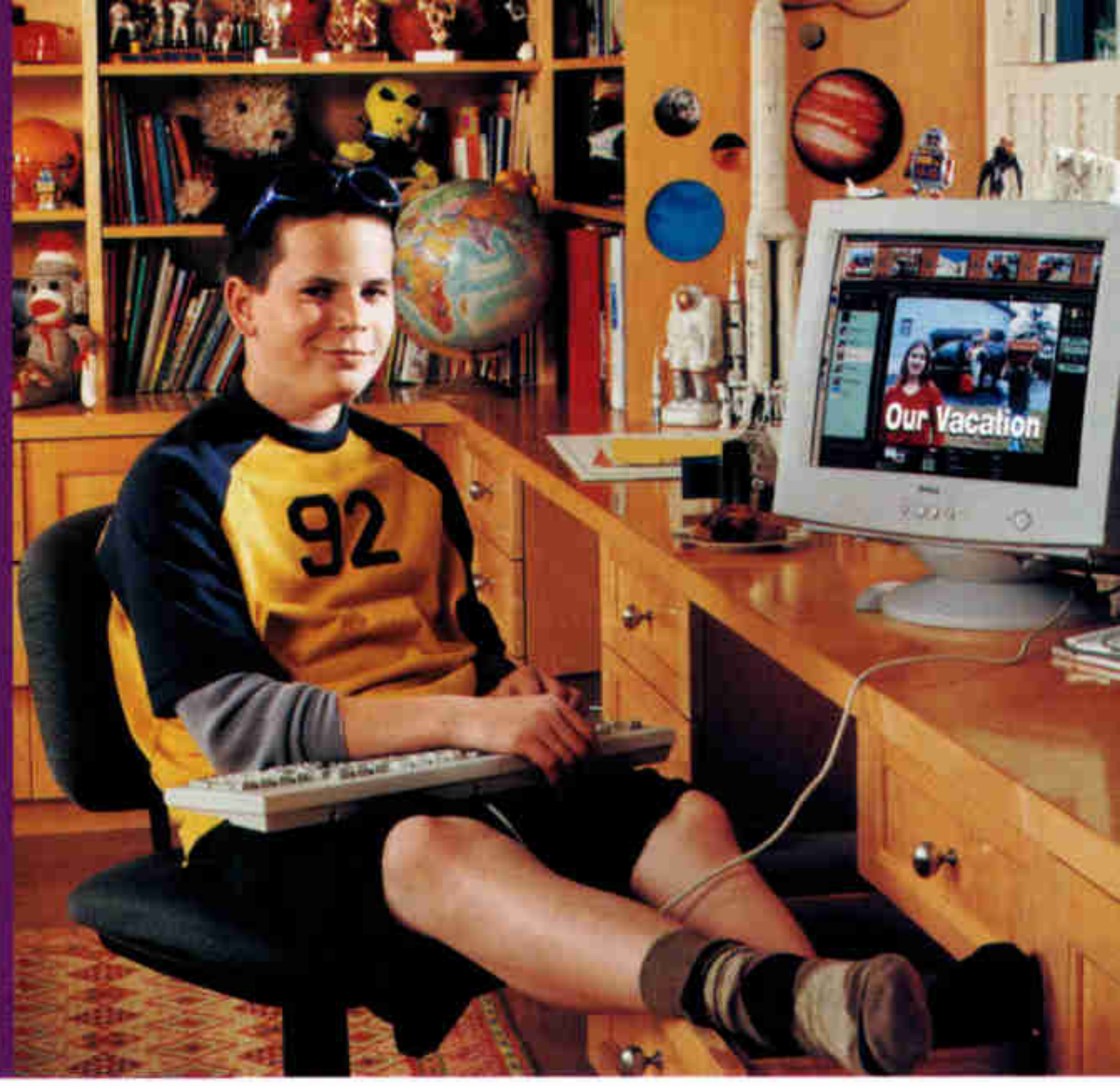
ADMINISTRATION
Finance: Michael J. Cole, *Controller;* H. Gregory Platts, *Treasurer.* **Membership and Marketing Services:** Mary P. Donohoe, Donna L. Hasslinger. **Human Resources:** Thomas A. Sabló. **Law:** Susan Borke, Angelo M. Grima, Suzanne R. McDowell

NATIONAL GEOGRAPHIC VENTURES
C. RICHARD ALLEN, *President and CEO*

Television: Timothy T. Kelly, *President.* **National Geographic Channel:** David Haslingden, *President, International;* Laureen Ong, *President, U.S.;* Andrew C. Wilk, *Exec. Vice President, Programming.* **nationalgeographic.com:** Mitchell Praver, *President.* **Maps:** William L. Stoehr, *President;* Allen Carroll, *Chief Cartographer.* **Enterprises:** Linda Berkeley, *President;* Lynn Cutter, *Travel;* John Dumbacher, *Licensing.* **Finance:** Frances A. Marshall

Copyright © 2000 National Geographic Society. All rights reserved. NATIONAL GEOGRAPHIC and Yellow Border: Registered Trademarks ® Marcas Registradas. NATIONAL GEOGRAPHIC assumes no responsibility for unsolicited materials.

17 hours of our trip to Mt. Rushmore edited down to 4 thrilling minutes.





DELL™ DIMENSION™ 4100 Series

Dell's Movie Studio

- Intel® Pentium® III Processor at 800MHz
- 64MB SDRAM ■ 10GB[5] Ultra ATA Hard Drive
- 17" (16.0" vis, .28dp) E770 Monitor
- 16MB ATI Rage™ 128 Pro ■ 48X Max CD-ROM Drive
- SoundBlaster 64V PCI LC Sound Card
- harman/kardon Speakers
- V.90 56K Capable[6] PCI Telephony Modem for Windows®
- IEEE 1394 PCI Card with MGI VideoWave® III Video Editing SW, Dell™ Edition
- MS® Works Suite 2000 ■ MS® Windows® Me
- 3-Yr Limited Warranty[2] ■ 1-Yr At-Home Service[4]

$1199 E•VALUE CODE 89279-501011v

- Canon® ZR-10 Digital Video Camcorder, add $899

The Dell™ Movie Studio. Movie Making made easy.

With our Dell™ Movie Studio solution, you'll be editing digital videos, adding soundtracks, selecting still images, and e-mailing your brilliance to the world faster than you can say "that's a wrap." Dell Movie Studio comes pre-tested and factory-loaded on select Dimension™ desktops, featuring powerful Intel® Pentium® III processors. And, of course, it's all backed by Dell's award-winning technical support. Dell Movie Studio. It's just one more way Dell4me™ helps your family get the most out of your PC. For more information go to www.dell4me.com/moviestudio

intel inside pentium® III

DELL4me.com

contact us today | **800.433.6675** | www.dell4me.com | DELL.COM

Includes Windows Millennium Edition — the home version of the world's favorite software.

Prices, specifications, and availability may change without notice. Taxes and shipping charges extra, and vary. Cannot be combined with other offers or discounts. U.S. only. Offer valid for Dell Home Systems Co. only. [2]For a copy of our Guarantees or Limited Warranties, write Dell USA L.P., Attn: Warranties, One Dell Way, Round Rock, Texas 78682. [4]At-Home or on-site service provided via third-party contract with customer. Technician will be dispatched, if necessary, following phone-based troubleshooting. To receive Next-Business-Day service, Dell must notify the service provider before 5pm (customer's time). Availability varies. Other conditions apply. [5]For hard drives, GB means 1 billion bytes; accessible capacity varies with operating environment. [6]Download speeds limited to 53Kbps. Upload speeds are less (about 30Kbps) and vary by modem manufacturer and online conditions. Analog phone line and compatible server required. Intel, the Intel Inside logo, and Pentium are registered trademarks of Intel Corporation. MS, Microsoft, and Windows are registered trademarks of Microsoft Corporation. ©2000 Dell Computer Corporation. All rights reserved.

Green Australia

In Scandinavian countries a tree has to be planted for every one logged. In this way forest renewal is ensured, as is the livelihood of loggers for generations to come.

K. REICHELT
Oslo, Norway

I cannot help but comment on the paradox of the child planting a *Melaleuca* seedling in Australia when *Melaleuca* is such a scourge in South Florida. Nearly a century ago some developers noted that the trees sucked up inordinate amounts of water and would be an economical way to drain the "worthless swamps." If only we could transport these alien visitors back to Australia.

MELINDA R. THEMM
Margate, Florida

The supplement map noted the existence of the Great Artesian Basin, but there wasn't another word about this vital water source, which underlies about 1.7 million square kilometers [.66 million square miles] of the continent. Extending beneath 22 percent of Australia's landmass, the Great Artesian Basin is said to be the largest artesian basin on Earth, with an estimated water storage of 8,700 million megaliters [2,300 trillion gallons] and ranging in depth from less than 100 meters to over 1,000 meters [328 to 3,280 feet]. Despite ongoing recharge the viability of the basin has been threatened for at least 25 years due to diminishing pressure caused by overuse.

KENNETH YARWOOD
Gold Coast, Australia



CARY WOLINSKY

I wonder if the loggers Kevin Briand [above] is trying to save the trees from are the same loggers who provided the timber to make the plywood that Kevin's perch seems to be made of.

JOHN HJORTLAND
Atascadero, California

the hunting camp, leaving no hard evidence of the mammoth's role in the camp's diet. Leaving the bulk of the carcass to carnivores made good sense—it would occupy them while our ancestors got away. It would also strip the bones so they could be used at the end of the season for building shelter.

R. A. BLAIS
Cupertino, California

The European bison *(Bison bonasus)* didn't disappear. Until the 17th century it was quite common in Eastern Europe. Today small herds still exist in Poland and Romania, on reservations, of course.

PAUL SPITZER
Haifa, Israel

There were once three species of bison in Europe. Two became extinct, but the third, Bison bonasus, *which had immigrated from North America, survived.*

I especially enjoyed the "People Like Us" article but would like to point out one inaccuracy. Neandertals are not extinct. I'm married to one!

MERRILY DUNCAN
Carnelian Bay, California

service, perhaps enterprising individuals like these could be persuaded to step back from similar wretched episodes of derelict humanitarian responsibility.

GEOFFREY GRIFFITH
Vancouver, British Columbia

Author Scott Thybony replies: Unfortunately not all risks can be foreseen. Our Navajo guide has used that trail for more than 30 years, and this was the first animal he lost. Many Navajo Indians recognize a strong bond with their horses; they consider them part of the family and treat them well. Losing a horse hit us all hard.

WRITE TO FORUM

National Geographic Magazine, PO Box 98198, Washington, DC 20090-8198, or by **fax** to **202-828-5460,** or via the Internet to **ngsforum@nationalgeographic.com.** Include name, address, and daytime telephone. Letters may be edited for clarity and space.

Playing the Slots

The article mentioned that a horse fell, fatally, from the pathway during a precarious ascent arranged by the author and others. Until hardened, self-serving ego is gentled by sincere concern for animals pressed into

When I read the description for the picture of Rainbow Bridge on page 121, I said, "Landscape Arch in Arches National Park is longer." Your article says, "Rainbow Bridge—the world's longest natural bridge—spans

Items you should check to see that they're certified:



If you had the choice, wouldn't you feel better choosing the product that's been certified? Our retailers are subjected to a grueling process that examines every aspect of what they do before they can earn Five Star certification. And in order to stay that way, they must maintain high customer satisfaction and pass an in-depth audit every year. So if you're thinking about a new vehicle or just need to schedule a service visit, before you choose a retailer–be sure to check the label. **Five Star. It's Better. We'll Prove It.℠**

For more information, call us at 1-800-677-5-STAR or visit www.fivestar.com. Jeep is a registered trademark of DaimlerChrysler.

The U.S. Mint's 50 State Quarters™ Program will help sponsor National Geographic World's 25th Birthday Tour to promote geography awareness in schools during a cross-country bus tour September through December 2000.

THE 50 STATE QUARTERS™ PROGRAM BROUGHT TO YOU BY THE PEOPLE OF THE UNITED STATES MINT.

SHARE HISTORY.

U.S. MINT MACHINE OPERATOR

LOUIS CORDERO

Louis is a machine operator for the U.S. Mint's 50 State Quarters™ Program. He makes sure that only the highest quality coins go into circulation.

These quarters feature designs unique to the history and legacy of our 50 states. Each quarter is made for about 10 weeks, never to be minted again.

You can order official U.S. Mint coin sets, maps and other fine collectibles directly from the U.S. Mint. It's a great way to share our country's history and legacy.



50 STATE QUARTERS™
UNITED STATES MINT

©2000 U.S. Mint

Call 1-800-USAMINT or visit **www.usmint.gov.**

275 feet." I got out my 1998 Arches National Park brochure and read that Landscape Arch measures 306 feet from base to base.

DENZEL R. CLINE
Puyallup, Washington

Natural arches and natural bridges are different geologic features. A natural bridge is formed by stream erosion, although the streambed may be long dry. Arches are formed with little or no help from streams and result from the erosion of fractured rock beds.

Although the canyoneers pictured on page 127 may have the agility of spiders, they certainly do not have the sense of spiders; at least our eight-legged friends ascend and descend with a line attached.

BARBARA JOSE
Yarmouth, Maine

The Samoan Way

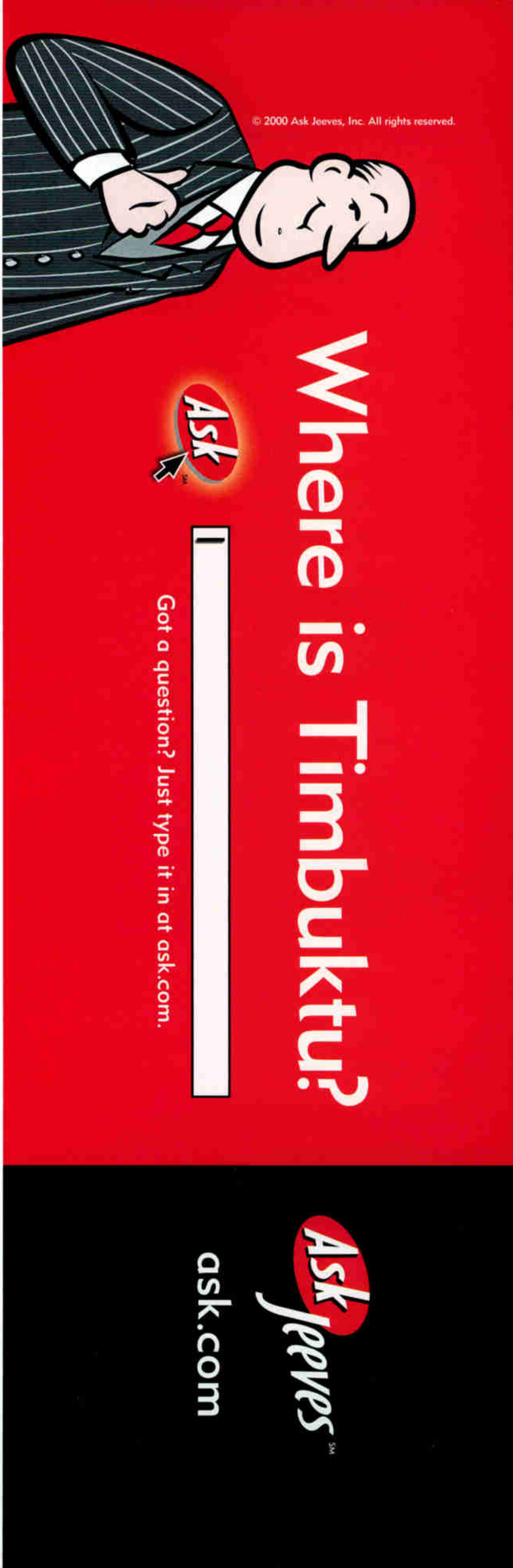
The photograph on page 84 of four happy teenagers nonchalantly napping on a lawn littered with plastic milk containers, soft drink cans, and an assortment of carelessly discarded litter and debris speaks far more about the future than you probably realized. Beauty in paradise is not free. The question is whether people, indigenous and non-indigenous, are prepared to pay the price in changing their habits and cultural traditions for that beauty to always be. More people wanting more conveniences, amenities, and manufactured products are only eroding the beauty of what once was.

S. N. LUTTICH
Malta, Montana

Something of note that may interest your readers: His Highness Malietoa Tanumafili II of Western Samoa [today the independent state of Samoa] in 1968 became the first head of state to embrace and convert to the Baha'i faith. Subsequently a substantial Baha'i community emerged, and in 1984 the first Baha'i House of Worship in Western Samoa was built in Apia.

KELLY GRUBE
Breinigsville, Pennsylvania

I read your article with growing excitement as I planned my next escape; yet it was with unexpected relief that I found no details regarding how to actually get to Samoa and



ADVERTISEMENT

advertiser.connections

Get more information from our advertising partners about the products and services they advertise in National Geographic magazine. Remember, our advertisers help make possible the Society's mission of education, exploration and research. To find out more, point and click to the following URLs:

American Express
www.americanexpress.com/trade
American Isuzu www.isuzu.com
American Plastics Council
www.plastics.org
Ask Jeeves www.ask.com
British Airways
www.britishairways.com/usa
Chevrolet Suburban
www.chevrolet.com/suburban
Dell Computer Corporation
www.dell4me.com
Dodge Caravan www.4adodge.com
DuPont www.dupont.com
First USA www.firstusa.com/xcards3/acards/national_geographic
5 Star- Chrysler, Plymouth, Jeep, Dodge
www.fivestar.com
Jeep www.jeep.com
Meade www.meade.com
Minolta www.minoltausa.com
Oldsmobile Silhouette
www.silhouettevan.com
ONDCP www.theantidrug.com
PBS www.pbs.org
Purina www.purinaone.com
Stewart Home School
www.stewarthome.com
Subaru www.subaru.com
Toyota www.isthistoyota.com

For more information regarding National Geographic Society products, mission-related programs and membership to the National Geographic Society, log onto www.nationalgeographic.com.

was reminded that the article was not, of course, a holiday brochure. Places like Ofu Island show us that in its purest form humanity can naturally foster love and peace. We need a thousand others like it, untouched and preserved.

MARCO VAN BELLE
Dublin, Ireland

Having completed two months of strenuous fieldwork in the rain forest of the National Park of American Samoa, I boarded the flight from Pago Pago to Honolulu contemplating how I could describe this park to my graduate committee. Then a flight attendant handed me your July issue. Usually NATIONAL GEOGRAPHIC articles take me away on some distant adventure. This time, however, you perfectly described everything I had experienced over the previous two months.

TRAVIS W. HEGGIE
Bryan, Texas

If the U.S. is so concerned with preserving the Samoan culture and environment, it should leave the decisions and control to those who have done so for 3,000 years.

MICHAEL FEROLITO
Talent, Oregon

Geographica

After the *Rebecca T. Ruark* was raised last fall, she was moved to the marine railway at the Chesapeake Bay Maritime Museum for repairs. Captain Murphy spent months restoring his 114-year-old boat and his livelihood. This summer the *Rebecca T. Ruark* slid back down the rails for an emotional relaunching witnessed by hundreds. With support from the state of Maryland, the museum is engaged in the "Save Our Skipjacks" program to maintain the antique wooden vessels that make up the last commercial fisheries fleet under sail in the U.S.

JOHN R. VALLIANT
Chesapeake Bay Maritime Museum
St. Michaels, Maryland

Editor's Page

If Australians wish to discourage visitors from climbing Ayers Rock, perhaps they should remove the handrail, which, according to the photo, is still in place.

HENRY G. TARBOX
Tucson, Arizona

IN THE 20TH CENTURY, MAN CONQUERED NATURE.



IN THE 21ST CENTURY, WE'LL HELP PROTECT IT.

Only through exploration will we learn the answers that will help preserve our natural resources, world cultures, languages and species. That's why for over 110 years, the National Geographic Society has sponsored thousands of exploration projects in the quest to learn more about the world we live in.

Together with our newest "Explorers-in-Residence," we'll work to help save our planet through a conservation initiative that will span the decade.



Join us as our accomplished explorers bring their world to yours through featured stories in magazines, www.nationalgeographic.com and coming to the U.S. this winter, our new National Geographic Channel.

What's more, we're proud to announce that National Geographic magazine has won the National Magazine Award in General Excellence, the most prestigious award in the magazine industry.

NATIONAL GEOGRAPHIC SOCIETY

National Geographic Explorers-in-Residence, clockwise from upper left: Robert Ballard, undersea explorer and discoverer of the Titanic, Bismarck and Yorktown. *Stephen Ambrose,* Lewis & Clark and World War II historian. *Wade Davis,* cultural anthropologist and botanical explorer of lost worlds. *Paul Sereno,* paleontologist and discoverer of several new dinosaur species. *Johan Reinhard,* high-altitude archaeologist and discoverer of the Inca Ice Maiden. *Jane Goodall,* conservationist and pioneer in the study of chimpanzee behavior. *Sylvia Earle,* marine biologist.

An online feature about the explorers can be found at www.nationalgeographic.com/eir

AMERICANA

Holding On to the Soul of Boley

Historic Oklahoma town waves the flag for the future

Every small town has a history. Boley, Oklahoma, has more than most. Founded in Indian Territory in 1903, the all-black town was started by people who believed that African Americans had a right to govern themselves. Potential citizens were recruited with ads mailed across the South. By 1911 Boley's population had reached 4,000. Booker T. Washington, one of many notables to visit, said of the town, "Boley is another chapter in the long struggle of the negro for moral, industrial, and political freedom."

But that chapter had an unhappy ending. After gaining statehood in 1907, Oklahoma passed laws disenfranchising blacks. Then the Depression bankrupted local farms and businesses, and many people moved away. Still, some held on. Though just 900 live there today, the country's biggest black rodeo is held in Boley every Memorial Day weekend, and crowds gather to watch the town's "Rough Riders" (above) parade in celebration. And some young people are moving back. Theodora Banks (below) spent 13 years in Los Angeles but recently returned to help her uncle T. R. McCormick run the town café.



"This is a peaceful place," says mayor Joan Matthews. Boley's last big crime occurred in 1932, when Pretty Boy Floyd's gang held up a local bank. Cashier H. C. McCormick shot the robbers as they fled. H. C. was café owner T. R. McCormick's cousin. It's a small town after all.

APHICA

CREATURES OF OUR UNIVERSE

PETER ESSICK (ABOVE AND FAR LEFT)



INSECT WORLD

Flexible Fliers

Nicknamed mosquito hawks, dragonflies can change their midair course in a split second. How do they do it? With rubberlike vein joints, says Stanislav Gorb, a biologist at Germany's Max Planck Institute. Made of proteins and chitin, dragonfly wings are laced with veins. Where they intersect, some veins are joined by an elastic protein called resilin, which makes the wings flexible. "We hope that these rubberlike joints will inspire aircraft engineers," says Gorb.

TIM LAMAN; ART BY MATTHEW FREY

ALMANAC

November

As autumn snows pelt California's High Sierra, pronghorn descend to low open country to feed. Ranging across the western United States, Canada, and Mexico, North America's swiftest land animal likely developed its speed during the Pleistocene, when it was pursued by cheetahs and hyenas that then roamed the continent.



TECHNOLOGY

A Very Tall Order

By the time it's completed in 2005, a statue now slated for construction in Bodh Gaya, India, will be the tallest edifice in that country—and the tallest figure of Buddha on the planet.

Artists and engineers in India and Britain are planning the Maitreya Project, a meditation park funded by Buddhist donors from all over the world. The centerpiece of the 40-acre park will be the 500-foot bronze-clad figure, so large that the Statue of Liberty would just reach its arm.

Designed according to traditional Buddhist ideals of statuary proportion and built to last a thousand years, the Buddha will sit on a 17-story building housing prayer halls, a museum, and thousands of art objects.



MAITREYA PROJECT

ENVIRONMENT

Eagles in Harm's Way

Spills reveal good news and bad

Last winter was a bad one for the Danube River watershed. Two thousand tons of fish were killed, putting fishermen out of work when cyanide and heavy metals spilled after snowmelt flooded a mine in Romania (map). In one tributary, the Tisza, Hungarian wildlife officials scrambled to protect white-tailed eagles from contamination. Once a resident species, the birds had vanished 30 years earlier. In a restoration effort during the 1980s biologists induced ten pairs of migrating eagles to remain in the area. Closely monitored during last winter's crisis, all those birds remained safe, but four other migratory eagles were found dead after eating contaminated fish. One female was found alive and was treated by veterinarian Déri János (right). She is expected to fully recover and to be released back into the wild.



BELA LIPTAK/ASSOCIATED PRESS

Special Advertising Supplement

HONORING the HUMAN SPIRIT



A SIMPLE, INGENIOUS SOLUTION HAS TOUCHED—AND SAVED—LIVES. 1998 Laureate Wijaya Godakumbura, a doctor in Sri Lanka, devised a new type of kerosene-oil lamp that would not cause fires if tipped over, a common and deadly problem in that country.

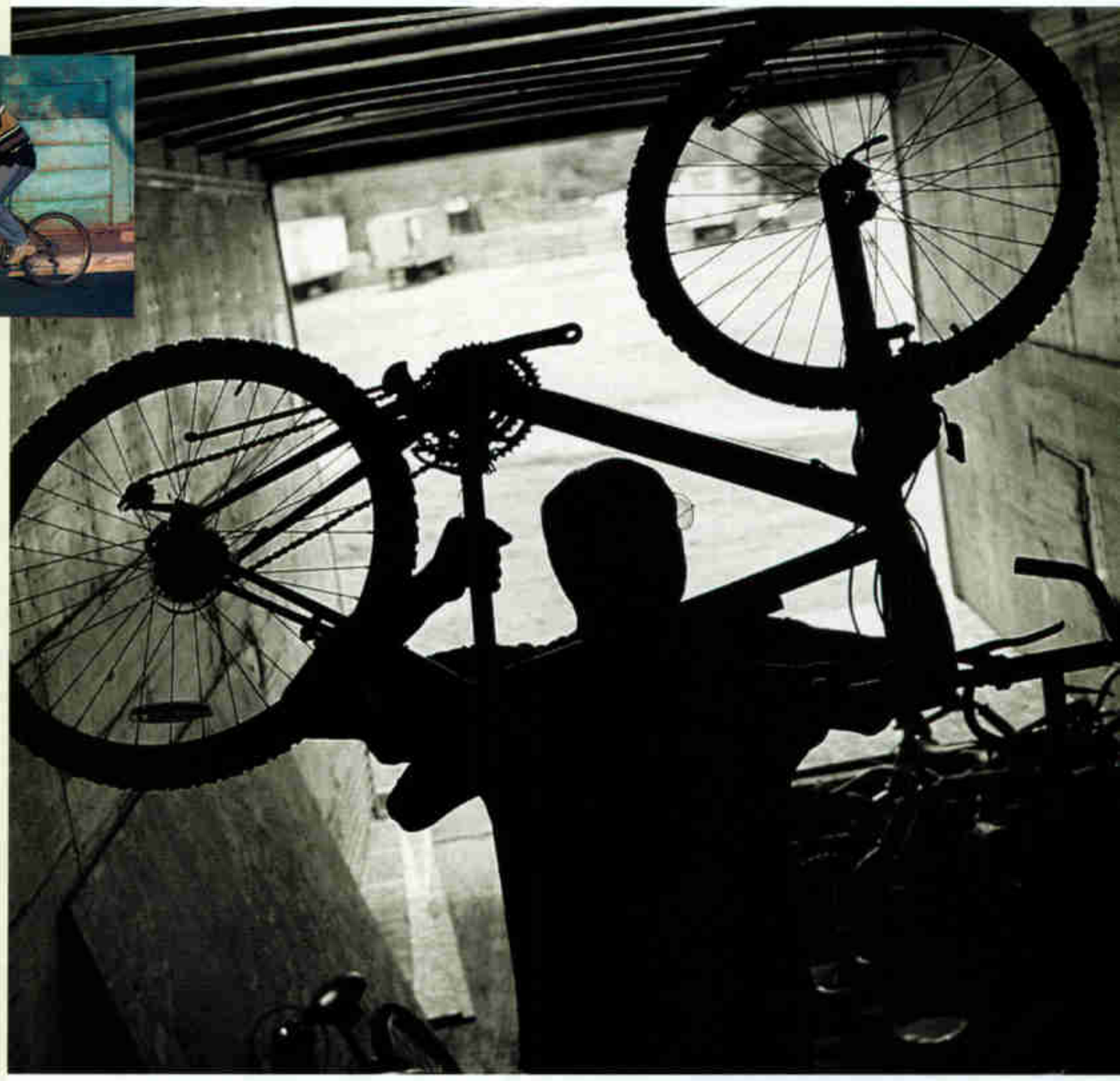
ROLEX

THE ROLEX AWARDS *for* ENTERPRISE



ROLEX CREATED THE AWARDS FOR ENTERPRISE IN 1976 TO HONOR MEN AND WOMEN WHO SHOW AN EXCEPTIONAL SPIRIT OF ENTERPRISE AND WHO ARE UNDERTAKING PROJECTS THAT WILL TOUCH AND ENRICH THE LIVES OF OTHERS. WINNERS ARE GIVEN THE RECOGNITION AND SUPPORT THEY NEED TO TURN THEIR DREAMS INTO PRACTICAL, WORKING PROJECTS.

THE AWARDS RECOGNIZE PIONEERING, INNOVATIVE PROJECTS THAT HAVE A POSITIVE IMPACT ON OUR WORLD OR OUR UNDERSTANDING OF IT. WINNERS ARE DRAWN FROM THE FIELDS OF SCIENCE, TECHNOLOGY, EXPLORATION, THE ENVIRONMENT, AND CULTURAL HERITAGE. THROUGH THESE AWARDS, ROLEX HOPES TO INSPIRE OTHER ENTERPRISING SPIRITS AROUND THE WORLD. THIS YEAR, FIVE LAUREATES WERE CHOSEN.





UNITED STATES: DAVID SCHWEIDENBACK

In countries where cars are beyond the means of most people and even bicycles are expensive and scarce, economic development is hampered by a lack of mobility. While serving in the Peace Corps, American teacher and carpenter David Schweidenback saw how owning a bicycle could radically change a poor person's life. He founded "Pedals for Progress", a non-profit organization that collects thousands of discarded bikes in the United States each year and ships them to developing countries, where they are repaired and sold for a low price. This affordable transportation improves productivity and helps bring prosperity to local communities.

"Owning a bicycle is a real sign of progress in developing countries where bikes are scarce and overpriced and a high percentage of the population walk everywhere they go."

David Schweidenback



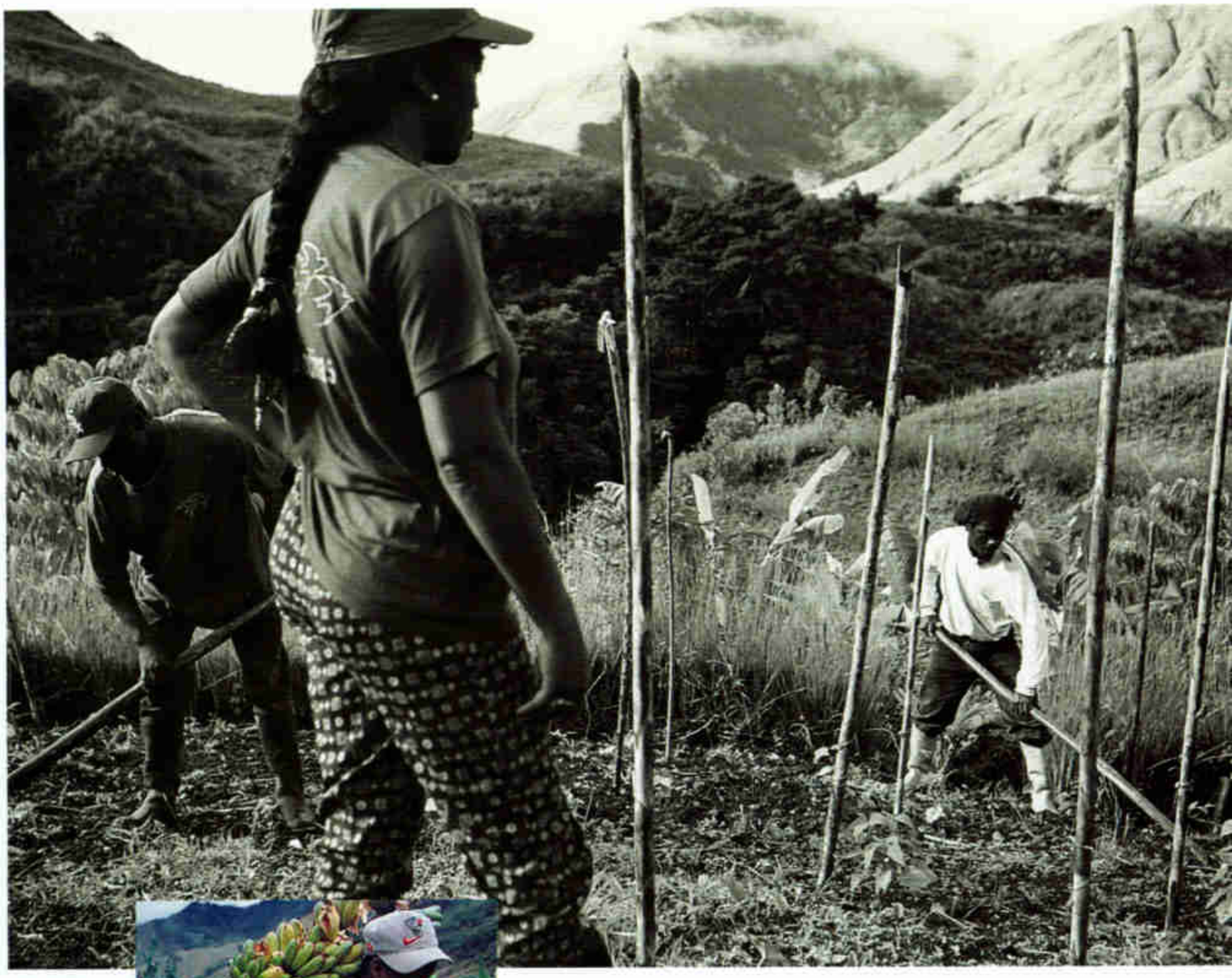


Ecuador: Maria Eliza Manteca Oñate

"We explain to farmers that by adopting sustainable agriculture, they will be able to dispense with chemicals and lead a more healthy life."

Maria Eliza Manteca Oñate

Destructive farming practices and the overexploitation of timber have destroyed over 90 percent of Ecuador's native forest, causing severe erosion and soil degradation. Determined to protect the remnants of indigenous forests, while at the same time improving living standards for rural people, Maria Eliza Manteca Oñate has established a nature reserve near her home village in the north of the country. She has also launched a successful education program, whereby adults and children learn sustainable farming techniques at a model farm.





The Rolex Awards for Enterprise







"In traditional Amchi medicine, the act of curing a patient is done with compassion and love and should not involve any payment."

Laurent Pordié

France: Laurent Pordié

The Tibetan system of medicine was once practiced throughout Central and Southeast Asia. Today, Ladakh, in northern India, is one of the few places where it remains central to community life. In the past, Amchis, or traditional doctors, provided their skills free of charge, with villagers shouldering their farming chores in return. But the introduction of conventional medicine and a growth in social mobility have seen that barter system fall from favor. With it, Amchi skills themselves have begun to disappear. Laurent Pordié, a young French ethno-pharmacologist, wants to re-establish these skills and improve healthcare in the region.

Canada: Elizabeth Nicholls

In 1991 a gigantic marine reptile known as an ichthyosaur was discovered in the wilderness of British Columbia. Canadian-American paleontologist Elizabeth Nicholls visited the site and quickly realized that the 23-metre-long fossil skeleton was by far the largest marine reptile ever found.

Nicholls has spent the last three years painstakingly excavating and studying the ichthyosaur, overcoming countless obstacles to extract the fossil from its limestone bed on a remote riverbank flooded for part of the year. This exceptional specimen, which is over 200 million years old, could open up whole new areas of knowledge of the earth's prehistory.



"The salvage, study and display of this incredible ichthyosaur will be a significant contribution to the scientific community and will present to the public the grandeur and diversity of life on our planet."

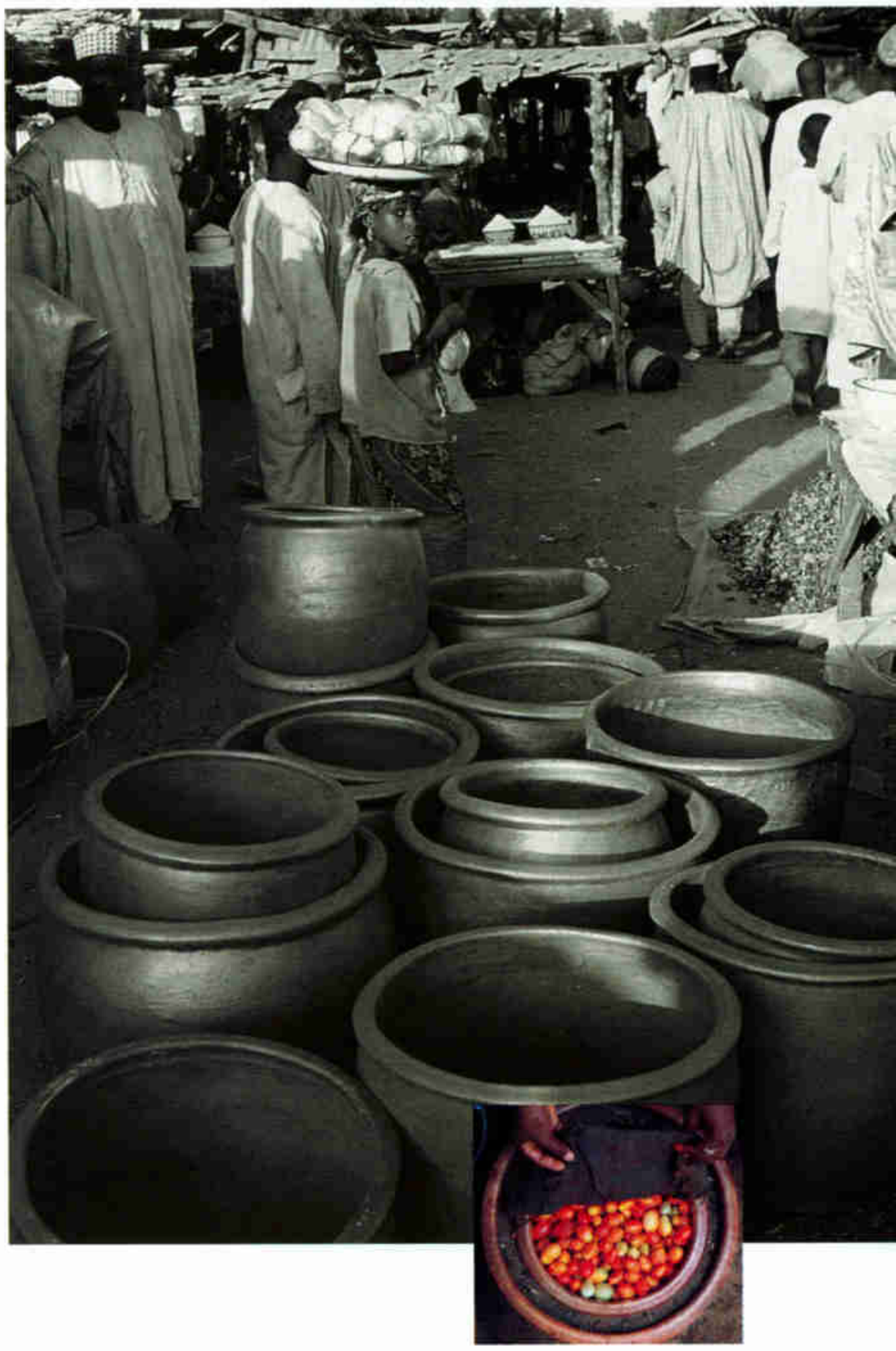
Elizabeth Nicholls





"The Pot-in-Pot system is a tangible and exciting solution to a severe local problem."

Mohammed Bah Abba



Nigeria: Mohammed Bah Abba

Northern Nigeria is an impoverished region where people in rural communities eke out a living from subsistence farming. With no electricity, and therefore no refrigeration, perishable foods spoil within days. Such spoilage causes disease and loss of income for needy farmers, who are forced to sell their produce daily. Nigerian teacher Mohammed Bah Abba was motivated by his concern for the rural poor and by his interest in indigenous African technology to seek a practical, local solution to these problems. His extremely simple and inexpensive "Pot-in-Pot" earthenware cooling device is starting to revolutionize lives in this semi-desert area.



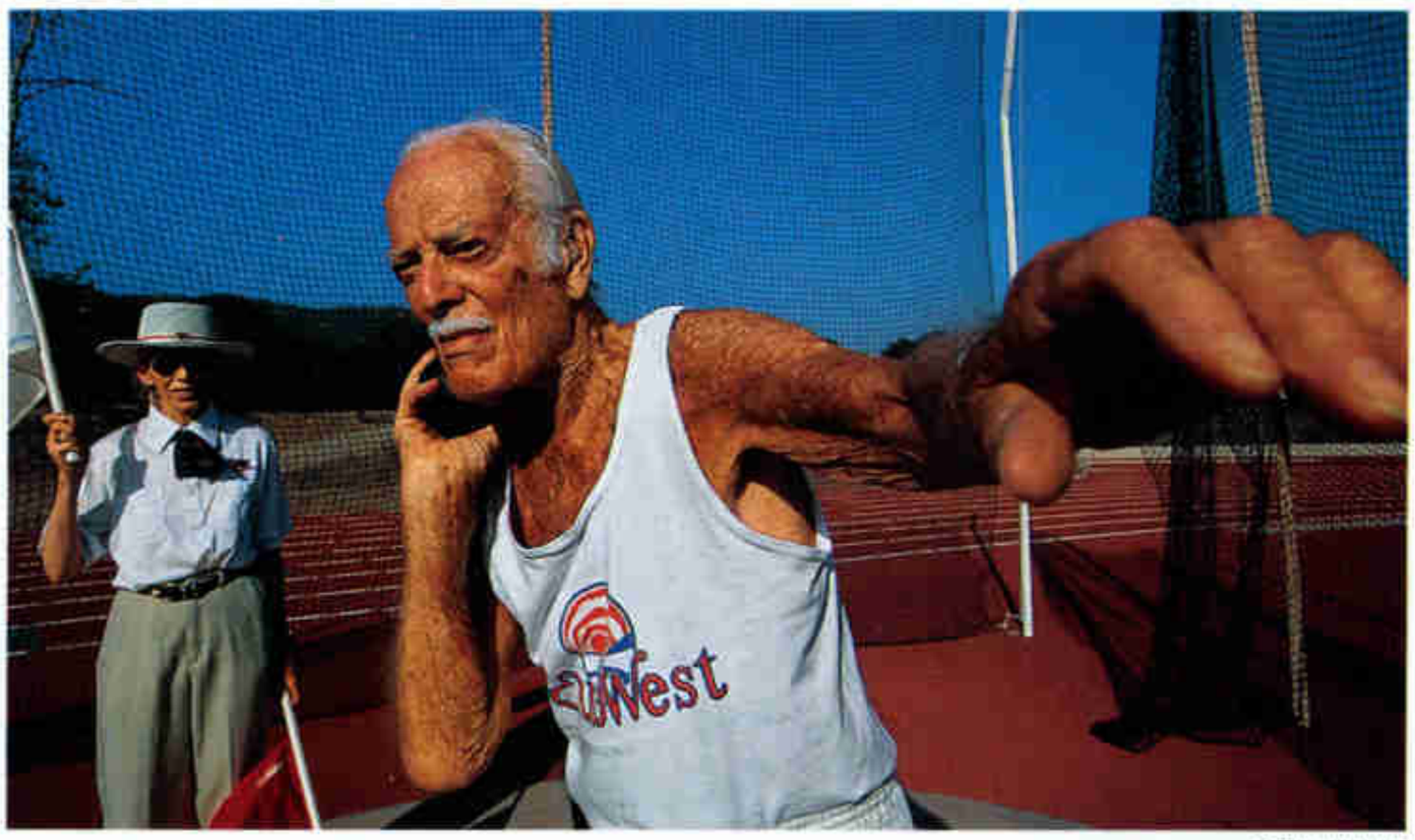
With vision, daring and dedication, these laureates are undertaking enterprises that will make a difference and honor the human spirit.

If you, too, have a new or ongoing project that will have a positive impact on our world or our understanding of it, we would like to hear from you. For further details or an application form for the Rolex Awards 2002, visit our website at www.rolexawards.com or write to: The Secretariat, The Rolex Awards for Enterprise, P.O. Box 1311, 1211 Geneva 26, Switzerland.

The Rolex Awards *for* Enterprise

THE HUMAN BODY

A Fit Centurion



GERD LUDWIG

Anticipating his 101st birthday this month, John Whittemore (right) is at the young end of his age group for the masters track-and-field events in which he competes. His category tops out at 104.

The retired businessman from Montecito, California, holds several world records in the shot put, discus, and javelin. John only took up these activities at 70, when a bad knee confined him to stationary field events. Before that he was a prizewinning swimmer, tennis player, and all-around athlete.

What does he like best about competing? "Winning!" he exclaims. John's currently the only track-and-field participant in his age group in the United States. So he wins every time.

U.S. HISTORY

Angel Island: Unhappy Haven

Recognizing the Asian immigrant experience



CALIFORNIA STATE PARKS (LEFT); IRA BLOCK

It was known as the Ellis Island of the West, and nearly one million immigrants passed through its gates (below) between 1910 and 1940. Now Angel Island Immigration Station, located on Angel Island State Park in California's San Francisco Bay, has been designated a national historic landmark—but not for any bright spot in its history. Here the American dream turned to nightmare for thousands of newly arrived Chinese, who were subject to restrictive immigration laws. Only merchants, scholars, and the spouses and minor children of those who had already gained United States citizenship were allowed to enter the country. Until they could prove their qualifications, thousands of the hopeful were confined in locked barracks—some for as long as two years.

Image Not Available

One anonymous immigrant-prisoner carved this poem (above right) into the soft wooden walls of the building where he was held: "From now on, I am departing far from this building. All of my fellow villagers are rejoicing with me. Don't say that everything within is Western styled. Even if it is built of jade, it has turned into a cage."

TAKE FIVE

Which states have the most champion trees? Winners of each species are judged on height, trunk circumference, and size of crown.

Florida 170
California 94
Texas 72
Arizona 69
Virginia 56

SOURCE: AMERICAN FORESTS



IT'S NOT ABOUT **WHERE** THE FAMILY GOES FROM HERE,

BUT **HOW.**

INTRODUCING **THE BEST SUBURBAN YET.** A FAMILY FAVORITE SINCE 1935, IT'S NOW EVEN BETTER.

THE ALL-NEW CHEVY™ SUBURBAN® HAS A MORE COMFORTABLE INTERIOR WITH MORE HIP ROOM AND HEADROOM,* NEW AVAILABLE SECOND-ROW BUCKET SEATS AND SUNROOF. MORE THAN AN EXTENSION OF ITS HERITAGE, IT'S THE START OF A NEW ERA. CHEVY TRUCKS, THE MOST DEPENDABLE, LONGEST-LASTING TRUCKS ON THE ROAD.†

SUBURBAN

LIKE A ROCK

*OVER 1999 MODEL. †DEPENDABILITY BASED ON LONGEVITY: 1981-1999 FULL-LINE LIGHT-DUTY TRUCK COMPANY REGISTRATIONS. EXCLUDES OTHER GM DIVISIONS. ©2000 GM CORP. BUCKLE UP, AMERICA! 1-800-950-2438 OR CHEVROLET.COM

NGS RESEARCH GRANT

Grisly Burial at a Moche Site

Excavating a communal kitchen on Peru's north coast, where the Moche culture dominated from A.D. 200 to 800, Northern Arizona University archaeologist George Gumerman IV and his team found pits full of llama bones. Unearthing a clay jar that held a llama's bones minus three of the legs, the team joked that diners had thrown a bad meal back; soon they'd find the cook. Joking stopped when they found a jar (right) with the bones of an arthritic man in his 50s—with both hands missing. "Perhaps the arthritis was so bad they cut off his hands," Gumerman says.



GEORGE GUMERMAN IV

NATURE

When and Why the Sun Turns Green



What is the green flash that residents of coastal areas—and even sites on land—see at sunset and sunrise? Is it real or, as Frank Deford pondered in his December 1999 article on the Florida Keys, "just a Keysian Loch Ness monster"? As these photographs show, there really is a green flash . . . sometimes.

"When rays of light enter the atmosphere, they're bent, and the amount of bending depends on the wavelengths," says Andrew T. Young, an astronomer at San Diego State University. "The blue and green end of the spectrum is normally bent more; the red and orange end is bent less." The colors are separated as if by a prism. On a hazeless, flat horizon, when the sea or land is sharply warmer or cooler than the air, red and orange wavelengths vanish, leaving blue and green dominant. The result: The sun's disk briefly flashes green.

TIM LAMAN

METEOROLOGY

It's a Bird, It's a Plane . . .

The sky began falling on Spain last January 8. Over the next ten days there were reports of 50 balls of ice, up to 30 pounds each, crashing onto cars, houses, and stores. Speculation about what was tumbling down ranged from comet debris to lavatory waste from airplanes.

A team led by Jesús Martínez-Frías of Spain's National Museum of Natural Sciences found that several of the balls were hoaxes, but at least nine were real. Unusually low atmospheric temperatures caused water vapor to adhere to ice droplets miles up, which then created large chunks of ice. "The phenomenon has been reported in China and Brazil," says Martínez-Frías. "What's unusual is so many in such a short period."



RICHARD THOMPSON

"The revolution is over.
I am the revolution."

A FILM BY DAVID GRUBIN

NAPOLEON

Soldier. Emperor. Lover. Statesman.

WEDNESDAY, NOVEMBER 8 AND 15

9 PM ET/PT on your PBS station

(CHECK LOCAL LISTINGS) CC

Could *you* win the Battle of Waterloo? Visit our virtual battlefield at pbs.org/napoleon and find out!

Visit us at pbs.org AOL Keyword: PBS

To purchase a PBS Home Video copy: 800-PLAY-PBS or shopPBS.com

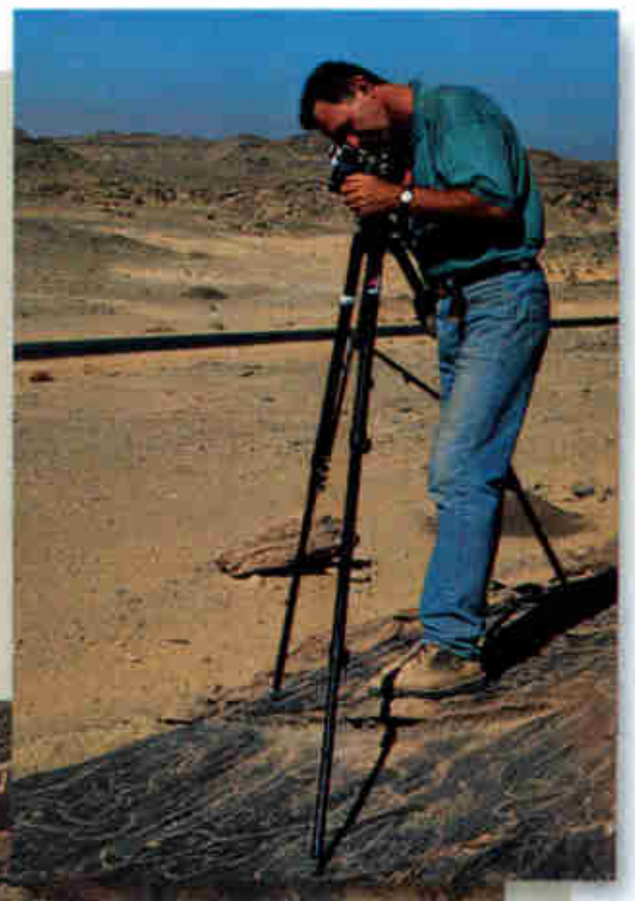
Stay curious PBS

NGS RESEARCH GRANT

Focusing on Rock Art

The race is on to record Egypt's past

For the past 21 years Dirk Huyge (top right) has studied ancient images chipped into sandstone near the Nile Valley village of El-Hosh. A curator of Egyptian antiquities at Belgium's Royal Museums of Art and History, he believes the images are Egypt's oldest art. The carvings, dated to around 5600 B.C., include overhead views of Nile "fish fences" (right), mushroom-shaped labyrinths designed to guide fish into pools for harvesting. But this ancient art may not be around much longer. Sandstone quarrying in the region, halted for 20 years, could resume at any time. And a new school built next to one of Huyge's study sites may end up using the rock art gallery as a playground.





BOTH BY DIRK HUYGE



MARY EVANS PICTURE LIBRARY

HISTORY

Dancing Disease

Modern doctor investigates old tradition

Since the eighth century, religious pilgrims such as those above have visited Echternach, Luxembourg, to dance at the grave of St. Willibrord, patron of those suffering from neurological disorders. The practice spread during the 14th century as Europeans sought protection against the plague. Luxembourg-born neurologist Paul Krack has studied accounts of the dancing and attributes its origins not to disease but to mass hysteria.



WHEN EMPLOYEES ARE HAPPY WITH THEIR 401(K) PLANS, IT SHOWS. They work harder and stay with you longer. We should know. As the nation's 401(k) leader, we've been helping growing businesses and their employees secure their financial futures for over 50 years. No wonder more companies choose The Principal® for their 401(k) plans.* Investment choice and education, recordkeeping, loan services and asset allocation—we've got what you need, plus personalized service and local support to make the process easy. What's not to love? If you'd like to hear what a 401(k) plan from The Principal can do for your employees, call 1-800-986-3343 (ext. 80080). One of our representatives will be happy to help, no matter what you're wearing.

WE UNDERSTAND WHAT YOU'RE WORKING FOR™

Principal® Financial Group

©2000 Principal Life Insurance Company, Des Moines, IA 50392. Products and services offered through Principal Life Insurance Company (The Principal®), its subsidiaries and affiliates. Mutual funds distributed through Princor Financial Services Corporation (member SIPC). *CFO Magazine, April/May 2000, based upon total plans served in 1999 by insurance companies, banks and investment firms.



JON O. HOLLOWAY

ENVIRONMENT

Apple Orchard Yields Bitter Fruit

Homeowners find pesticides in topsoil

As small farms fail and houses rise, so can trouble. In North Carolina, Barber Orchard produced apples from 1903 until 1988, when it was sold and became a subdivision. In 1999, when one new resident had her well water tested, contaminants were detected. Later DDT, lead, and arsenic were found in the soil. Pesticides had been sprayed for decades on the orchard. The EPA has declared the subdivision a Superfund site and has replaced topsoil on 28 lots, including David Miller's (above).

"People mainly worry about children playing in the dirt," he says. More cases like Barber Orchard may await other North Carolinians who build homes on former agricultural land. "This just may be the tip of the iceberg," says Miller.

ECOLOGY

Grave News

Cemetery for the ages, Ramsey Creek Preserve in South Carolina offers an alternative to traditional burials. Featuring fieldstones for grave markers and biodegradable caskets, the two-year-old cemetery tucks graves along a trail, which protects native plants. A computer database helps visitors find loved ones along the wooded trail and offers biographical sketches of the deceased. A global positioning system is also planned.



ART BY HAL MAYFORTH

WILDLIFE

Flamingo Die-offs



KARL VICK

A pink carpet of death occasionally lines the shores of Lakes Bogoria and Nakuru in Kenya. Out of a million lesser flamingos, at least 50,000 perished in mass die-offs in 1993 and 1995. Nomadic birds, lesser flamingos move in search of reliable food sources and fresh water from the lakes' feeder rivers and streams. Another die-off occurred at the lakes between the summer of 1999 and early this year, says veterinarian Gideon Motelin of Kenya's Egerton University. An unknown number of flamingos perished. One possible cause: an algal toxin ingested by the birds. But heavy metals such as iron, zinc, and chromium, as well as other contaminants, were also detected in the carcasses. Industries and farms in the watershed are possible sources.

©2000 Eveready Battery Company, Inc.

power this outrageous

now available in a battery

Energizer e²™

the battery with
a heart of titanium

Energizer e² TITANIUM TECHNOLOGY

www.energizer-e2.com

take power to the next level™

LEGAL NOTICE

If you own or owned a home or structure with Weyerhaeuser hardboard siding, a proposed class action settlement may affect your rights.

You may be entitled to file a claim for monetary compensation.

A proposed nationwide settlement of class action lawsuits related to Weyerhaeuser brand exterior hardboard siding has been reached in Williams, et al., v. Weyerhaeuser Company, Civil Action No. 995787, and preliminarily approved by the Superior Court of California in and for the County of San Francisco (the "Court"). This Notice is a summary. You may call toll free or visit the website to obtain a Mailed Notice with more information.

The proposed Settlement will pay current and former owners of homes or other structures for damages associated with their Weyerhaeuser hardboard siding.

WEYERHAEUSER HAS AGREED TO PAY ALL TIMELY CLAIMS FOR SIDING DAMAGE THAT QUALIFIES FOR COMPENSATION UNDER THE SETTLEMENT AGREEMENT.

You are a member of the Class if you own or owned a structure in the United States on which Weyerhaeuser brand hardboard siding has been installed from January 1, 1981 through December 31, 1999. The Mailed Notice identifies certain exclusions from the Class including personal injury claims.

How to identify Weyerhaeuser hardboard siding

You may ask the builder of your property, or remove a piece of the siding to see whether "AHA 10" or "AHA 20" is stamped on the back, or take it to your local building supply store, which may be able to assist you. Weyerhaeuser hardboard siding was made from wood fiber, wax and resin, distributed in both lap (board) and panel (sheet) applications, and was available in various external textures designed to look like conventional wood siding.

How to file a claim

The Settlement establishes a claims process to pay monetary damages for valid claims for certain damage to siding, including thickness swell, edge checking, physical degradation, buckling, surface welting, swelling, delamination, sponginess, wax bleed, and raised or popped fibers. Siding damage attributable to improper design or installation will be excluded. The Settlement also provides a compensation formula which will be used to determine how much money, if any, you are entitled to receive.

THERE IS NO CAP ON THE TOTAL NUMBER OF CLAIMS OR MONETARY DAMAGES TO BE PAID.

The Settlement Agreement provides a staggered claims program. Under these guidelines, the later your siding was installed, the more time you have to file a claim. The Mailed Notice describes how to prove that your property has Weyerhaeuser hardboard siding. You may call or visit the website to receive the Mailed Notice or request a Claim Form.

The Court will hold a hearing on December 21, 2000, to consider whether to grant final approval to the proposed Settlement and Class Counsel's request for attorneys' fees and costs. The fees will be tied to the total claims paid, but will not reduce any class member's recovery under the Settlement. You have the right to appear at the hearing, although you do not have to.

You may comment on, or object to, the terms of the proposed Settlement by November 13, 2000. The Mailed Notice describes how to submit comments or objections.

If you do not wish to participate in or be bound by the proposed Settlement, you must exclude yourself as described in the Mailed Notice, by November 13, 2000, or you will be barred from prosecuting any legal action against Weyerhaeuser relating to the settled claims. If you exclude yourself, you may NOT file a claim and you will not receive compensation under the Settlement.

For a Mailed Notice or to request a Claim Form, call toll free **1-800-365-0697** or see the website at **www.weyerclaims.com.** You may also write to Weyerhaeuser Claims, P.O. Box 9443, Garden City, NY 11530-9443. PLEASE DO NOT CONTACT THE COURT.

1-800-365-0697 www.weyerclaims.com

A healthy dose of nature from National Geographic.

NATIONAL GEOGRAPHIC

NATURE'S MEDICINE

Plants That Heal



A chronicle of mankind's search for healing plants through the ages

JOEL L. SWERDLOW, PH.D.

PHOTOGRAPHS BY LYNN JOHNSON

Travel the world in search of exotic treatments for everything from hiccups to leukemia. Through hundreds of full-color illustrations and vivid storytelling, award-winning author Joel L. Swerdlow, Ph.D., chronicles humanity's age-old facination with healing plants. And nature's miraculous contributions to modern medicine. Look for National Geographic's comprehensive reference *Nature's Medicine: Plants That Heal* wherever books are sold.

NATIONAL GEOGRAPHIC BOOKS

$35.00 / 400 pages / 300 full-color photographs and illustrations / 0-7922-7586-1



RANDY OLSON (ABOVE); NGS PHOTOGRAPHER MARK THIESSEN

Cheers for Geography

In the classroom, in competition, on film

Students at Perry Elementary School in Erie, Pennsylvania (above), have something to cheer about: their new Gilbert M. Grosvenor Learning Lab. "Everything in that school revolves around geography," says Gil Grosvenor, Chairman of the Society's Board of Trustees, who attended the dedication. "There's a world map in the cafeteria, a map of the continents in the hallway, a geography quiz every day. I'd bet second graders there would score better on geography tests than students at Ivy League schools."

Felix Peng, 13, of Guilford, Connecticut (above right), getting a congratulatory hug from his mother, Catherine, also has reason to celebrate. Felix won the 12th annual National Geographic Bee a year after he first competed in Washington. The



son of Taiwanese immigrants edged out George Thampy, 12, of Maryland Heights, Missouri, in a tense final round. But don't feel too bad for George. A week later he won the National Spelling Bee.

Geography education also plays a role in a new film, *Pay It Forward,* whose sets include maps and videos provided by the Society. Kevin Spacey (left) portrays a teacher whose assignment on how to make the world better changes a boy's life.



DAVID JAMES, WB AND BEL AIR PICTURES

OUTBACK®

L.L.Bean EDITION



RUGGED. DEPENDABLE. WEATHER-RESISTANT.

JUST WHAT YOU'D EXPECT FROM L.L.BEAN.

Introducing the Outback L.L.Bean Edition from Subaru. Its six powerful cylinders will definitely put a kick in your next trip. And the traction of full-time All-Wheel Drive will help you tackle whatever kind of weather nature throws at you. In other words, you'll be able to go where you want, when you want. Plus, with amenities like leather-trimmed seats and a mahogany and leather steering wheel by Momo,® you're going to look great in it. Visit us at **www.subaru.com**, call 1-800-WANT-AWD or stop in for a test-drive. The Outback L.L.Bean Edition. It's exactly what you'd expect from two authorities in outdoor adventure.

SUBARU

The Beauty of All-Wheel Drive.®

The ABC's of Safety: Air bags. Buckle up. Children in back.





Family Albums

Paging through historic Society expeditions

National Geographic explorers really used to do things by the book. Before there were 35-mm slide trays, the people we sent to cover "the world and all that is in it" had their work bound at headquarters in big leather albums. Photographs to be published in the magazine were then chosen from the books.

The Society's archives contain hundreds of these albums, including volumes covering Neil Judd's 1920s expeditions to New Mexico's Pueblo Bonito (left), Robert F. Griggs's 40 albums from Alaska's Valley of Ten Thousand Smokes (1921 image, above), and Hiram Bingham's 23 albums from Machu Picchu (1911 image, below) in Peru.



Some people never worry about a lounge being available for them. **Are you one of them?**



Wouldn't it be nice if your status preceded you, no matter where you fly? Our alliance recognizes top-tier frequent flyer privileges on eight of the world's finest airlines, including access to over 340 lounges.

Welcome to **one**world.™

oneworld revolves around you.

AmericanAirlines

Aer Lingus

BRITISH AIRWAYS

CATHAY PACIFIC

FINNAIR

IBERIA

LANCHILE

QANTAS

For premium cabin and selected top-tier frequent flyer customers. Some privileges vary between airlines. Each **one**world alliance airline reserves the right to change its frequent flyer program rules, regulations, travel awards and special offers and to end their frequent flyer program in accordance with its relevant frequent flyer program rules. All **one**world benefits are only available to passengers on scheduled flights that are both operated and marketed by a **one**world member airline. (Marketed means there must be a **one**world member airline flight number on your ticket.) American Airlines, Aer Lingus, British Airways, Cathay Pacific, Finnair, Iberia, LanChile and Qantas are all trademarks of their respective companies.

www.oneworldalliance.com



Seeing Red. . .

and scarlet and crimson and carmine

As the GEOGRAPHIC began to use color more frequently in the 1950s, editors wanted the most eye-catching hues to be employed, and photographers obliged. The result has since been termed the "Red Shirt School of Photography," named for the appearance of bright clothing in otherwise quiet color schemes.







JUSTIN LOCKE (TOP); ROBERT F. SISSON

THEODORE R. SILLS & CO. (CENTER); ALEXANDER TAYLOR

Some photos raise questions: In a shot from February 1950 (above) another shirt collar peeks from beneath the subject's red one.

According to magazine veteran Luis Marden, a pioneer of color photography, "The red shirt came to be associated with the GEOGRAPHIC because very few but the GEOGRAPHIC published color. It's easy to criticize the past—the trouble is we're doing it by today's standards."



Photographed by Luiz Claudio Marigo

WILDLIFE AS CANON SEES IT

A male black-hooded antwren tends to its two chicks, barely visible from their deep, delicately woven nest. The nestlings eat a variety of food, from spiders and beetles to moths and mosquitoes. After the young leave the nest, both parents continue to feed them for at least another 40 days, and each takes full charge of only one fledgling. Highly protective, the antwrens protest loudly in a rattled voice to defend their eggs and offspring from potential predators. The black-hooded antwren was thought to be extinct until its rediscovery in 1987, and is now endangered due to habitat fragmentation and development of land in its restricted range.

As a global corporation committed to social and environmental concerns, we join in worldwide efforts to promote greater awareness of endangered species for the benefit of future generations.



Black-hooded Antwren
(Formicivora erythronotos)
Size: Length, 11 cm
Weight: 9-9.5 g
Habitat: Secondary scrub in the Atlantic coastal region of eastern Brazil
Surviving number: Estimated at 4,000; occurring in seven isolated populations

© 2000 Canon Inc. www.canon.com

NATURE
Watch NATURE on PBS. This program is funded, in part, by Canon.

Canon

Pioneer Woman

Tales of a traveling life

An associate editor was dubious; in 1937 "girls" didn't take foreign trips alone. But Editor Gilbert H. Grosvenor gave Dorothy Hosmer the go-ahead. Between 1938 and 1940 he published three of her tales of a bicycle trip through Poland and Romania, including this photograph of her lunching with Romanian caviar fishermen (GEOGRAPHIC, March 1940).





DOROTHY HOSMER (ABOVE); STEVE MEDD, PRESS-ENTERPRISE

Now 89, Dorothy Hosmer Lee (left) is featured in a new Society book, *Women Photographers at National Geographic*. After her trip she returned to the States, married and was widowed, and worked for the U.S. Air Force until 1971. "Then I started traveling again," she says. Her journeys included a trip to China for a congress on Esperanto, one of "five and a half languages" she speaks. "I've forgotten half my Italian," she explains.

100 YEARS AGO

November 1900

"The fact that the wild animals of the world are in danger of extermination is being forcibly driven home to the minds of all who are interested in natural history. This condition is the result of the ruthless persistence with which game of every kind is hunted, and it may be laid at the door mainly of the rapacious gatherers of hides and ivory. These . . . are assisted to a marked degree by sportsmen and hunters."
—from "Africa the Largest Game Preserve in the World," by John B. Torbert



HEATHER R. HOFFMAN, NGS STAFF

EXPLORER-IN-RESIDENCE

President Clinton asked oceanographer Sylvia Earle to speak when he unveiled ocean protection plans at Maryland's Assateague Island National Seashore in May. "Just as the Society supported parks last century, we're now moving toward protection and exploration of the seas," Earle says.

FOR MORE INFORMATION

Call: 1-800-NGS-LINE
(1-800-647-5463) Toll free from U.S., Canada, 8 a.m.–midnight ET, Mon.–Fri. 8:30 a.m.–7 p.m. ET, Sat.
For a free catalog call:
1-800-447-0647
Special device for the hearing-impaired (TDD) 1-800-548-9797
Write: National Geographic Society
PO Box 98199
Washington, DC 20090-8199
Internet: nationalgeographic.com

One awkward moment with my doctor ended two awkward years with my wife.

—VIAGRA has shown improvement in erectile function in 4 out of 5 men compared with 1 out of 4 for sugar tablets

—More than 17 million prescriptions written in the United States*

—Effective and well tolerated in a variety of patients

—More than 6 million men in the US have been prescribed VIAGRA (1 million were also taking blood pressure–lowering medication)

With VIAGRA, she and I have a lot of catching up to do.

VIAGRA is not for everyone. Be sure to ask your doctor if your heart is healthy enough to handle the extra strain of sexual activity. If you have chest pains, dizziness, or nausea during sex, stop and immediately tell your doctor.

If you're a man who uses nitrate drugs, never take VIAGRA—your blood pressure could suddenly drop to an unsafe level. With VIAGRA, the most common side effects are headache, facial flushing, and upset stomach. VIAGRA may also briefly cause bluish vision, sensitivity to light, or blurred vision. In the rare event of an erection lasting more than 4 hours, seek immediate medical help. Remember to protect yourself and your partner from sexually transmitted diseases.

Please see patient summary of information about VIAGRA *(25-mg, 50-mg, 100-mg) tablets on the following page.*

*Data on file. Pfizer Inc, New York, NY.

Ask your doctor if a FREE TRIAL of VIAGRA is right for you.
For more information, call 1-888-4VIAGRA or visit www.viagra.com.

VIAGRA®
(sildenafil citrate) tablets
Love life again.

L o v e l i f e a g a i n.



PATIENT SUMMARY OF INFORMATION ABOUT

VIAGRA®
(sildenafil citrate) tablets

This summary contains important information about VIAGRA®. It is not meant to take the place of your doctor's instructions. Read this information carefully before you start taking VIAGRA. Ask your doctor or pharmacist if you do not understand any of this information or if you want to know more about VIAGRA.

This medicine can help many men when it is used as prescribed by their doctors. However, VIAGRA is not for everyone. It is intended for use only by men who have a condition called erectile dysfunction. **VIAGRA must never be used by men who are taking medicines that contain nitrates of any kind, at any time. This includes nitroglycerin. If you take VIAGRA with any nitrate medicine your blood pressure could suddenly drop to an unsafe or life threatening level.**

What Is VIAGRA?

VIAGRA is a pill used to treat erectile dysfunction (impotence) in men. It can help many men who have erectile dysfunction get and keep an erection when they become sexually excited (stimulated).

You will not get an erection just by taking this medicine. VIAGRA helps a man with erectile dysfunction get an erection only when he is sexually excited.

How Sex Affects the Body

When a man is sexually excited, the penis rapidly fills with more blood than usual. The penis then expands and hardens. This is called an erection. After the man is done having sex, this extra blood flows out of the penis back into the body. The erection goes away. If an erection lasts for a long time (more than 6 hours), it can permanently damage your penis. You should call a doctor immediately if you ever have a prolonged erection that lasts more than 4 hours.

Some conditions and medicines interfere with this natural erection process. The penis cannot fill with enough blood. The man cannot have an erection. This is called erectile dysfunction if it becomes a frequent problem.

During sex, your heart works harder. Therefore sexual activity may not be advisable for people who have heart problems. Before you start any treatment for erectile dysfunction, ask your doctor if your heart is healthy enough to handle the extra strain of having sex. If you have chest pains, dizziness or nausea during sex, stop having sex and immediately tell your doctor you have had this problem.

How VIAGRA Works

VIAGRA enables many men with erectile dysfunction to respond to sexual stimulation. When a man is sexually excited, VIAGRA helps the penis fill with enough blood to cause an erection. After sex is over, the erection goes away.

VIAGRA Is Not for Everyone

As noted above (*How Sex Affects the Body*), ask your doctor if your heart is healthy enough for sexual activity.

If you take any medicines that contain nitrates–either regularly or as needed–you should never take VIAGRA. If you take VIAGRA with any nitrate medicine or recreational drug containing nitrates, your blood pressure could suddenly drop to an unsafe level. You could get dizzy, faint, or even have a heart attack or stroke. Nitrates are found in many prescription medicines that are used to treat angina (chest pain due to heart disease)such as:

- nitroglycerin (sprays, ointments, skin patches or pastes, and tablets that are swallowed or dissolved in the mouth)
- isosorbide mononitrate and isosorbide dinitrate (tablets that are swallowed, chewed, or dissolved in the mouth)

Nitrates are also found in recreational drugs such as amyl nitrate or nitrite ("poppers"). If you are not sure if any of your medicines contain nitrates, or if you do not understand what nitrates are, ask your doctor or pharmacist.

VIAGRA is only for patients with erectile dysfunction. VIAGRA is not for newborns, children, or women. Do not let anyone else take your VIAGRA. VIAGRA must be used only under a doctor's supervision.

What VIAGRA Does Not Do

- VIAGRA does not cure erectile dysfunction. It is a treatment for erectile dysfunction.
- VIAGRA does not protect you or your partner from getting sexually transmitted diseases, including HIV–the virus that causes AIDS.
- VIAGRA is not a hormone or an aphrodisiac.

What To Tell Your Doctor Before You Begin VIAGRA

Only your doctor can decide if VIAGRA is right for you. VIAGRA can cause mild, temporary lowering of your blood pressure. You will need to have a thorough medical exam to diagnose your erectile dysfunction and to find out if you can safely take VIAGRA alone or with your other medicines. Your doctor should determine if your heart is healthy enough to handle the extra strain of having sex.

Be sure to tell your doctor if you:

- have ever had any heart problems (e.g., angina, chest pain, heart failure, irregular heart beats, or heart attack)
- have ever had a stroke
- have low or high blood pressure
- have a rare inherited eye disease called retinitis pigmentosa
- have ever had any kidney problems
- have ever had any liver problems
- have ever had any blood problems, including sickle cell anemia or leukemia
- are allergic to sildenafil or any of the other ingredients of VIAGRA tablets
- have a deformed penis, Peyronie's disease, or ever had an erection that lasted more than 4 hours
- have stomach ulcers or any types of bleeding problems
- are taking any other medicines

VIAGRA and Other Medicines

Some medicines can change the way VIAGRA works. Tell your doctor about **any medicines** you are taking. Do not start or stop taking any medicines before checking with your doctor or pharmacist. This includes prescription and nonprescription medicines or remedies. Remember, VIAGRA should never be used with medicines that contain nitrates (see *VIAGRA Is Not for Everyone*). If you are taking a protease inhibitor, your dose may be adjusted (please see *Finding the Right Dose for You.*) VIAGRA should not be used with any other medical treatments that cause erections. These treatments include pills, medicines that are injected or inserted into the penis, implants or vacuum pumps.

Finding the Right Dose for You

VIAGRA comes in different doses (25 mg, 50 mg and 100 mg). If you do not get the results you expect, talk with your doctor. You and your doctor can determine the dose that works best for you.

- Do not take more VIAGRA than your doctor prescribes.
- If you think you need a larger dose of VIAGRA, check with your doctor.
- VIAGRA should not be taken more than once a day.

If you are older than age 65, or have serious liver or kidney problems, your doctor may start you at the lowest dose (25 mg) of VIAGRA. If you are taking protease inhibitors, such as for the treatment of HIV, your doctor may recommend a 25 mg dose and may limit you to a maximum single dose of 25 mg of VIAGRA in a 48 hour period.

How To Take VIAGRA

Take VIAGRA about one hour before you plan to have sex. Beginning in about 30 minutes and for up to 4 hours, VIAGRA can help you get an erection if you are sexually excited. If you take VIAGRA after a high-fat meal (such as a cheeseburger and french fries), the medicine may take a little longer to start working. VIAGRA can help you get an erection when you are sexually excited. You will not get an erection just by taking the pill.

Possible Side Effects

Like all medicines, VIAGRA can cause some side effects. These effects are usually mild to moderate and usually don't last longer than a few hours. Some of these side effects are more likely to occur with higher doses. The most common side effects of VIAGRA are headache, flushing of the face, and upset stomach. Less common side effects that may occur are temporary changes in color vision (such as trouble telling the difference between blue and green objects or having a blue color tinge to them), eyes being more sensitive to light, or blurred vision.

In rare instances, men have reported an erection that lasts many hours. You should call a doctor immediately if you ever have an erection that lasts more than 4 hours. If not treated right away, permanent damage to your penis could occur (see *How Sex Affects the Body*).

Heart attack, stroke, irregular heart beats, and death have been reported rarely in men taking VIAGRA. Most, but not all, of these men had heart problems before taking this medicine. It is not possible to determine whether these events were directly related to VIAGRA.

VIAGRA may cause other side effects besides those listed on this sheet. If you want more information or develop any side effects or symptoms you are concerned about, call your doctor.

Accidental Overdose

In case of accidental overdose, call your doctor right away.

Storing VIAGRA

Keep VIAGRA out of the reach of children. Keep VIAGRA in its original container. Store at room temperature, 59°-86°F (15°-30°C).

For More Information on VIAGRA

VIAGRA is a prescription medicine used to treat erectile dysfunction. Only your doctor can decide if it is right for you. This sheet is only a summary. If you have any questions or want more information about VIAGRA, talk with your doctor or pharmacist, visit www.viagra.com, or call 1-888-4VIAGRA.

23-5515-00-4

VIAGRA®
(sildenafil citrate) tablets

HC576A99

© 2000, Pfizer Inc

Pfizer U.S. Pharmaceuticals

The dollars you give to the United Way go right back into our community,
working their little denominations to the bone to make this a better, more caring place to live.
Not just for all of our neighbors who need help today. But for all of us who might need it tomorrow.
Isn't it nice to know what goes around stays around?

United Way



nationalgeographic.com

Webscapes

■ LIBYA

Leader Muammar Qaddafi of Libya (pages 2-31) made photographer Reza wait seven days for a photo shoot. Get the surprising reason why in Reza's online interview.
nationalgeographic.com/ngm/0011

■ ZIP CODES

Do you prefer your own zip code to 90210? Nominate yours, or someone else's, for the magazine to cover.
. . . /ngm/0011

■ NEWS

Satellite images illuminate the world's top news stories in our Eye in the Sky series.
. . . /news/eye

■ KIDS

Add your own punch lines to create one-of-a-kind comics at our online Cartoon Factory.
. . . /kids/ngo/cartoons



GEORGE STEINMETZ

Dino Search

Working by lantern at a campsite in Niger, paleontologist Paul Sereno, at right, and colleague Didier Dutheil pore over NASA satellite images of the Sahara. In 1997 the desert yielded the first skeleton of a hundred-million-year-old spinosaur. You can follow Sereno's latest Sahara expedition via multimedia field dispatches at *nationalgeographic.com/dinoquest*.

Worldview

A workman cleaning stained glass at the Mapparium in Boston gets an intimate view of the world, as do visitors to our online Xpedition Hall, where "Culture Goggles" and "Paris Scope" make geography fun. Crack codes, play real estate agent to a *T. rex*, and more on Family Xpeditions. Celebrate Geography Awareness Week at *. . . /xpeditions*.



BOB SACHA (ABOVE); MAURICE AND KATIA KRAFFT

VOLCANOES ON THE WEB



■ OVERVIEW
The National Museum of Natural History profiles volcanic activity for each region on Earth.

■ HAZARDS
The U.S. Geological Survey provides a primer on volcanic activity and human safety.

■ KIDS SITE
Volcano World includes lesson plans, games, and video clips.

■ IMAGES
Michigan Tech displays satellite images of Earth's ten most active volcanoes.

■ ONE-STOP SURFING
Find these links and more at *. . . /linked*.

E-mail:
online@nationalgeographic.com
Register for our free e-mail newsletter: nationalgeographic.com/community/register.html
E-mail for Member Services:
ngsline@customersvc.com

DEFENSE DEPT.



You and your family have a strong ally in the daily battle to keep your food safe. Plastic bottles, plastic wraps and plastic containers reduce the potential for food spoilage and help protect products from contamination. And, tamper-evident plastic seals provide an extra measure of product safety assurance. They're all working to keep your family's food protected from the moment it's packaged until the time it arrives home. To learn more about the benefits of plastics, contact the American Plastics Council at www.plastics.org or call 1-800-2-HELP-90.

American Plastics Council®

PLASTICS MAKE IT POSSIBLE.®

©2000 American Plastics Council. All rights reserved.

National Geographic TV



DAN AND CINDY HARTMAN (ABOVE); NATIONAL PARK SERVICE

PBS, NOVEMBER 15

Triumph of the Wolves

Yellowstone's premier predator reclaims the park



The moment a pack of gray wolves from Canada was released into Yellowstone National Park, filmmaker Bob Landis began documenting their feats of survival. Based on more than five years of fieldwork, *Return of the Wolf* offers rarely filmed scenes of wolves in the wild. The endangered gray wolf (left), condemned by ranchers, had been killed off in Yellowstone some 60 years ago. Aided by biologist Doug Smith, who oversaw the reintroduction of several wolf packs, Landis followed the Druid Peak pack on winter hunts (top). The National Geographic Special also captures tense encounters between rival packs and the Druids' acceptance of a new alpha male to lead them in their newfound wilderness.

■ Programming information accurate at press time; consult local listings or our website at nationalgeographic.com. Watch for the National Geographic Channel when traveling abroad.

National Geographic EXPLORER
CNBC. Weekends, 8 p.m. ET/PT.
National Geographic Specials See local listings.
National Geographic Videos, Kids Videos, and DVDs Call 1-800-627-5162.

Ask Us

THE ANSWER PLACE

Our Research Correspondence staff responds to questions from curious readers.

Q Does the Panama Canal have three locks because of differing sea levels in the Atlantic and Pacific Oceans?

A No. The mean sea level for the Atlantic and Pacific is virtually the same, but the tides in the Pacific vary as much as 18 feet, while on the Atlantic side the variation is about two feet. The difference, potentially disruptive to navigation, is one reason the canal was built with locks. In addition, constructing a sea-level canal would have been more costly and time-consuming.

Q Which continent is the windiest?

A Antarctica. With expanses of ice and snow that offer no barrier, Antarctica has winds that sometimes reach a hundred miles an hour or more.

Q In what language were the four Gospels (Matthew, Mark, Luke, and John) written?

A Like the rest of the New Testament, the four Gospels were written in Greek, which was widely spoken in Roman times. Jesus and his disciples spoke Aramaic.

MORE INFORMATION

Send questions to **Ask Us, National Geographic Magazine, PO Box 96095, Washington, DC 20090-6095** or via the Internet to **ngsaskus@nationalgeographic.com.** Include name, address, and daytime phone number.

CARTOGRAPHIC

Q Where in Mexico do monarch butterflies migrate each year?

A Monarchs fly to the mountains west of Mexico City near the town of Angangueo, where they inhabit several sanctuaries on the southwest slopes of the mountains.





STEVE RAYMER

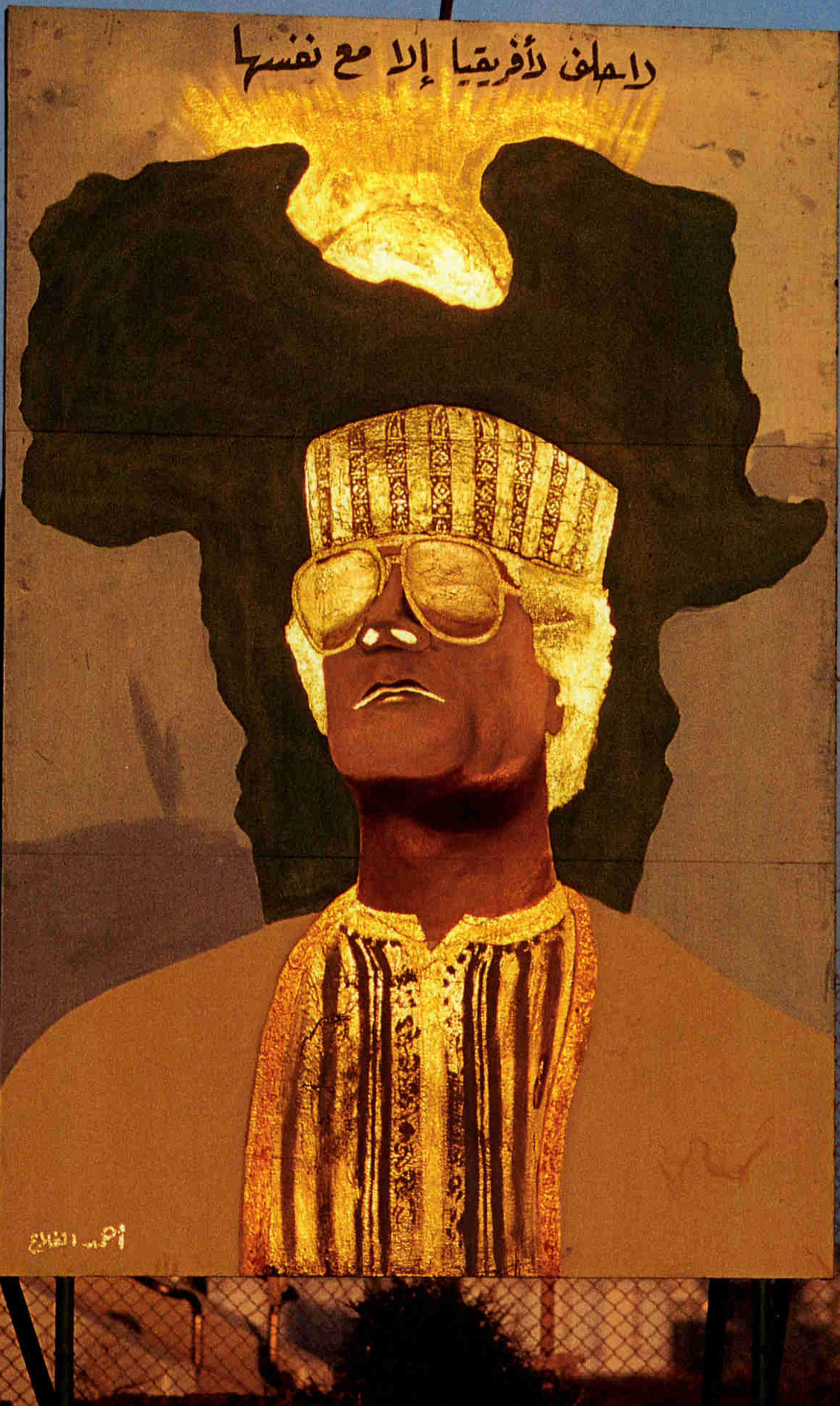
TELL US

Why is this man reaching for the sky—with the ground?
Hint: Sometimes the safest place to be is subterranean.

Think you know the answer? Go online to nationalgeographic.com/ngm/tellus/0011 and test yourself, or read it here in next month's issue.

OCTOBER ANSWER Ticks of the species *Aponomma komodoense* find a perfect home—and perfect match—on the bumpy skin of a Komodo dragon. The Indonesian reptile is the only host on which these parasites will live.

راحلف لأفريقيا إلا مع نفسها



أحمد الفلاق

LONG HIDDEN BEHIND THE FACE AND RHETORIC OF ITS RULER, OIL-RICH LIBYA NOW EMERGES FROM SECLUSION. BY TRYING TO SHED HIS TERRORIST IMAGE, MUAMMAR QADDAFI SEEKS TO MAKE PEACE WITH THE OUTSIDE WORLD.

LIBYA

AN END TO ISOLATION?

Inescapable visage of Qaddafi appears in Ras al Unuf outside a giant petrochemical facility.

CONCEALED

Islamic tradition permits one eye to show from a robe worn by a woman

at the Tripoli airport. The austere dress code is followed mostly in Libya's remote desert villages.

REVEALED

Young Libyans pulse to Arab pop music during a Tripoli wedding event



reserved for women. Since Qaddafi preaches a classless society, the rich try to keep a low profile.

BY ANDREW COCKBURN · PHOTOGRAPHS BY REZA

Housam, a guide from the Libyan Ministry of Information, had run only 20 yards from his hotel room to mine, but he was perspiring. "Come quickly," he said, "the Leader is waiting for you in Banghazi. There is a plane ready." We raced downstairs. The government driver, allegedly on standby for just this occasion, had characteristically disappeared. Cursing, Housam led me in a sprint to his own car, and we roared off down the corniche that runs along the Mediterranean seafront of Tripoli, Libya's capital city. We were heading away from the city's main commercial airport.

After a few miles we suddenly peeled off the highway and sped through a gate onto an airfield where a dozen huge Russian-built Ilyushin-76 military transport planes were parked. We climbed a ladder into the vast cargo bay of one of the planes. Waiting inside were Fuad, Muammar Qaddafi's English interpreter, and a youth named Ibrahim toting two large cardboard boxes tied with string. I asked what was in the boxes. "Correspondence for the Leader," replied Fuad, lighting a cigarette. So this was how Muammar Qaddafi gets his mail.

"Do you notice how they're trying to get that light in the cockpit to go out?" remarked Fuad. "There is a problem with this plane." A nervous-looking pilot appeared at the door moments later and concurred that the plane was not safe. We climbed down, got back in our car, and drove into town. "*Kul takhira fi'khira,*" said Fuad cheerfully, "sometimes it is better to delay," a common Libyan phrase that I was beginning to know well.

This was a voyage of exploration. For years Libya has been a country largely unknown to the outside world. Even the few outsiders who managed to make their way here usually found it impossible to penetrate beneath the surface. Casual contact between ordinary Libyans and foreigners was heavily discouraged as Qaddafi, who came to power in 1969, gradually imposed his own brand of revolutionary theory on the country. As embassies closed and foreign companies pulled out throughout the 1970s and '80s, there was an ever diminishing number of visitors from the Western world.

Libya's isolation became even more pronounced following the 1992 imposition of United Nations sanctions designed to force Qaddafi to hand over two suspects indicted for the bombing of Pan Am flight 103 over Lockerbie, Scotland, in December 1988, killing 270 people.



Office high-rises, the latest stratum of buildings in 2,600-year-old Tripoli, Libya's capital city, climb above the cramped urban core (top right). The Old Quarter, pungent with cooking smells (right), huddles inside city walls built in the second century by Romans, who also left behind the noble ruins of Leptis Magna (above) on the Mediterranean shore.




الفاتح
قاتل
رجاله
الفاتح
ثورة
إسلامية
مطعم السلسبيل
يرحب بكم

Qaddafi refused for seven years to release the suspects for trial in either the United States or Britain, defying the international community and reinforcing Libya's image as a terrorist state, its people crushed under a dictatorial regime of unbridled repression.

Qaddafi had done much to court this reputation. For years he harbored the infamous terrorist Abu Nidal. He was there for the Irish Republican Army when it needed him, supplying large quantities of arms in the later stages of the Northern Ireland conflict. Libyan agents have murdered people around the world, the victims for the most part "stray dogs"—exiled dissidents on whom Qaddafi had declared war.

When Qaddafi surrendered the Lockerbie suspects in April 1999 for a trial in the Netherlands starting in May 2000, the UN suspended sanctions—although the United States still maintains its own embargo. As the trial began, Qaddafi seemed to feel confident that his years as an international pariah were drawing to an end. He declared that it was "absurd" to postulate that he had ordered the bombing. "The court is sitting to judge them," he told the press, "not whether they are Libyan agents."

In fact, some countries appear ready to forgive crimes where Libyan guilt is far more certain than in the Lockerbie case. In July 1999, for example, Libya agreed to pay compensation to the relatives of the 170



To supply water to its coastal cities, Libya is spending 25 billion dollars to build the Great Man-Made River. Tripoli in 1996 began receiving water pumped from distant desert aquifers.



Grainfields and citrus groves border the Libyan coast (above), while farther inland the Sahara covers 90 percent of the country (map). Oil fields make the nation of five million people one of Africa's richest states. Seizing power in 1969, Qaddafi gained notoriety by sponsoring anti-Western terrorism. The United Nations lifted sanctions against Libya in 1999.

victims of the French airline UTA flight 772, which was destroyed by a bomb over Niger in 1989. A Paris court had found Qaddafi's brother-in-law, Abdullah al-Sanusi, guilty of orchestrating the mass murder.

Now French diplomats and businessmen are among those from around the world who disembark regularly at Tripoli's airport, suddenly bustling after being closed to international flights for the better part of a decade. Foreign businessmen flock to Tripoli as the government makes pleas for foreign investment. All-terrain vehicles filled with European tourists ply the Sahara dunes. Libyans themselves are not only permitted but actually encouraged to embark on private business ventures.

Still, Libya is hardly a country where travel for outsiders is routine, a truth rendered evident by my journey to meet the Leader. Hardly had we returned after the abortive trip to the military airport when Housam reappeared. "There's another plane," he gasped. "Come quick."

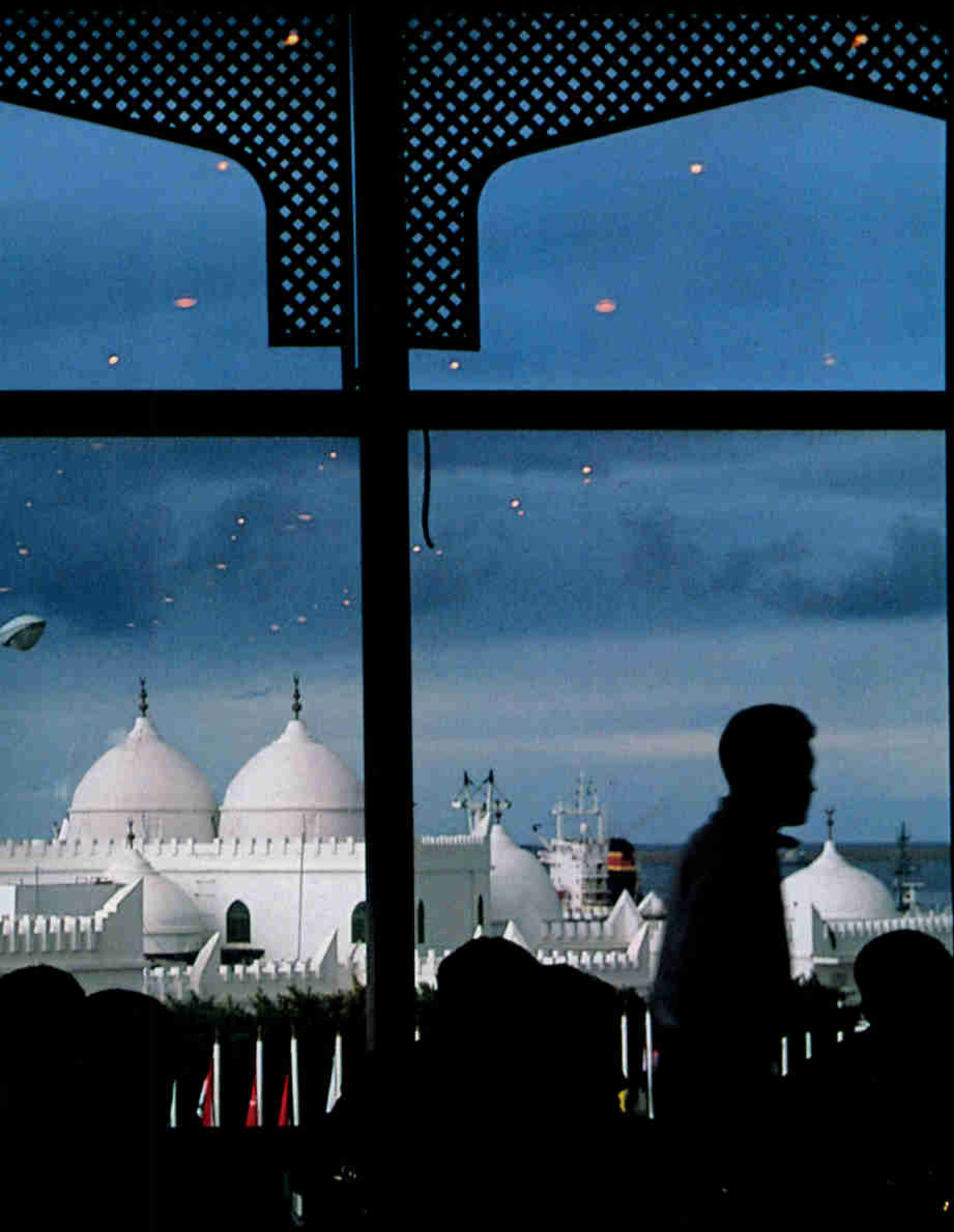
This time we drove to the main civilian airport, where we were ushered onto a modern jetliner, part of the Libyan Arab Airlines fleet. Ibrahim reappeared with the boxes containing the Leader's mail. Later I was told that our plane had been diverted from its scheduled afternoon flight to Malta, leaving would-be passengers steaming in the terminal.

We took off, soaring east over green fields dotted with farmhouses along the fertile strip that edges the coast. Far to the south I could see the yellow fringe that marks the beginning of the great sandy waste of the Libyan desert, stretching far into Africa. We were headed for Al Bayda, a sleepy town in the mercifully cool Cyrenaic uplands east of Banghazi.

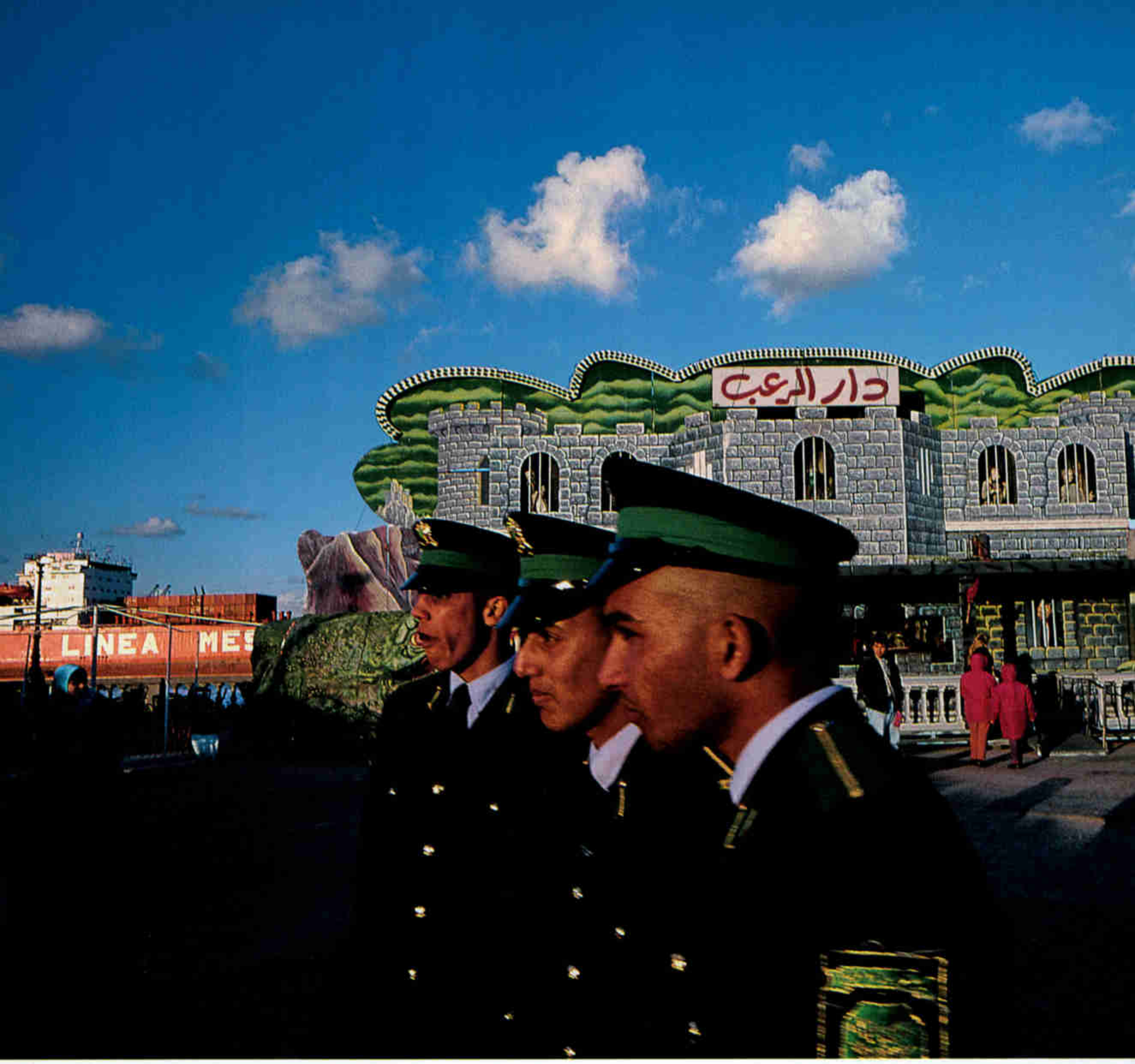
Late that night I was driven down dark and empty back roads to Qaddafi's temporary residence, a marble-floored villa set in spacious grounds. Just before we pulled up, I noticed an open canvas shelter with a brightly colored checkerboard pattern—a familiar image from pictures of Qaddafi, dressed in extravagant cloaks and turbans, greeting visitors "in his tent." We bypassed the tent, and I was ushered into the

PROSPECTS

A serene view of Al Shaab mosque from a hotel on Tripoli's harbor front



diverts foreign businessmen whose days are spent chasing deals in the investment-hungry country.



mansion to a formal drawing room furnished with white velvet chairs and decorated with framed pictures of Qaddafi's wife and children.

Qaddafi himself finally entered the room, leaning on an aluminum crutch that clicked rhythmically on the marble floor. He had broken his leg some months before, the injury variously ascribed to an assassination attempt, an accident on the football field, a fall in the bathroom, or a fall while trying to climb out the bathroom window—a confusion indicative of the miasma of rumor that surrounds Qaddafi. (A close friend of the Libyan leader insisted to me that the fall in the bathroom was the correct version of the story.)

Clad in a faded sport shirt, khaki slacks, and worn leather slippers, Qaddafi presented a very different picture from the flamboyant figure in extravagant dress long familiar to the outside world. He looked tired. In the past 12 hours he had talked with three African presidents and the Italian foreign minister, worked on plans for a summit conference, and given a stern lecture to the city fathers of Beida regarding unchecked development in the picturesque Green Mountains around the city. "We are a backward country," Qaddafi said matter-of-factly. "People don't

Military students case an amusement park in Tripoli for the chance to meet women in public. The make-believe "House of Terror" behind them unwittingly hints at a grim reality: Libyan jails in which dissidents are allegedly tortured.

In the former royal palace two young women enjoy the small freedom of cruising the Internet at a cybercafé (right).



understand that we are damaging the land, damaging the environment."

The Leader had also spent a few hours reading a book on mergers and acquisitions in pursuit of his present project to unite Africa. "I work 25 hours a day—but reading is part of the work, and I am a slow reader. Often I have to read things several times to understand." He sighed. The effect was disarming, as were his frequent chuckles and word-play jokes.

The country Qaddafi rules stretches for more than a thousand miles along the North African coast from Tunisia to Egypt and another thousand deep into the heart of the Sahara. Before Qaddafi achieved power and gave Libya notoriety, this vast land—three times the size of France—reposed in obscurity, making only periodic appearances on the world stage.

Long before recorded history the desert interior, where daytime temperatures can exceed 130 degrees, was a lush tropical landscape. The people who lived there left images of their daily lives carved and painted on the rocks of the Acacus mountain range in the far southwest before they vanished in the face of the advancing desert some 4,000 years ago.

Scattered oases, all that remained of human habitation, became the way stations of caravans from central Africa as they skirted the great sand seas of Murzuq in the west or Rebiana in the east, the desolate black mountains of the Jabal as-Sawda, and the vast stony plain of the Hammada al-Hamra before finally reaching the farmlands, settlements, and ports along the Mediterranean. Here in Tripolitania at the western end of the country and Cyrenaica in the east, rainfall and underground reservoirs produced lush landscapes of wheat fields, olive groves, and fruit plantations—little different from the landscapes of southern Italy a few hundred miles across the sea.

Before and after the Arabs erupted out of their homeland in the Arabian Peninsula in the seventh century, planting their language, religion, and culture across all of North Africa, the coastal strip was a corridor for invaders passing back and forth between Egypt and the lands to the west. Roman legions marched this way, conquering the settlements of

"LIBYANS CAN WATCH ANYTHING THEY WANT," QADDAFI RESPONDED SHARPLY, "BUT VISITORS SHOULD LEARN ABOUT LIBYA."



the Phoenician and Greek colonists who first traded along the coasts. Mementos of ancient civilization are everywhere, notably in the cities preserved for centuries in the drifting Saharan sands that buried them long ago. In the east, toward the Egyptian frontier, sand also preserves the lethal legacy of more recent transients—land mines laid by the British Eighth Army and the German Afrika Korps during their epic battles in World War II.

For all this weight of cosmopolitan history, Libya is a young country. Loosely controlled by the Ottoman Empire until early in the 20th century, the peoples of Tripolitania and Cyrenaica, as well as Fezzan, which covers most of the southern desert region, had little in common, still less a sense of nationhood, until the Italians made a belated bid for empire and invaded in 1911. Though the invaders had expected an easy conquest, it took them 20 years to stamp out the last resistance. In the occupation of what Mussolini called "Italy's fourth shore," the Italians beautified Tripoli, excavated the Roman cities, and presided over the death of as much as a quarter of the population.

Finally in 1951 Libya became an independent kingdom with an economy based on exports of scrap metal from the wartime battlefields, esparto grass (used for making fine paper), and rent from U.S. and British military bases.

Eight years after independence the average annual income was 25 dollars. But in 1959 American companies began striking oil, and Libya went from being one of the poorest countries in the world to being, potentially at least, one of the richest. I recall a 1964 party thrown on a beach outside Tripoli by an overnight millionaire. The entire expanse of sand, down to the waterline, had been covered with oriental carpets. Then in 1969, irked by pervasive corruption and inspired by the Arab nationalism of his idol, Egyptian leader Gamal Abdel Nasser, 27-year-old army Capt. Muammar Qaddafi, the son of a desert nomad, overthrew the feeble monarchy in a bloodless coup and began his revolution.

Qaddafi gradually eliminated foreign investment, abolished private enterprise, forbade all political parties, renamed the months of the year, supported revolutionary causes around the world, implemented his own concepts of democracy, and eventually renamed the country the Great Jamahiriya, which translates roughly as "ruled by the masses." Libya gradually disappeared behind the face, rhetoric, and dubious actions of its leader while some five million ordinary Libyans remained anonymous, their daily lives a mystery. "The outside world thinks that this country consists of a man and a desert," Libyan playwright Mohammed al-Allasi remarked to me one evening as we sipped coffee in a Tripoli theater, "but we are more than that."



Sign of a devout household, butchered sheep, sacrificed for a Muslim holy day, intrigue a Moroccan girl in Tripoli's Old Quarter. Foreign laborers and their families fill this run-down sector.

The fact that the isolation is beginning to lift might not be immediately evident to visitors who switch on the TV in their Tripoli hotel rooms and find only a single local channel of unremitting tedium, heavy on the Leader's speeches and the historical iniquities of various foreign invaders over the centuries. Yet the rooftops of Tripoli and Banghazi are studded with satellite dishes beaming in dozens of channels from around the world. During my meeting with Qaddafi I asked why he does not permit foreign broadcasts in the hotels. "Libyans can watch anything they want," he responded sharply, "but visitors should learn about Libya."



That, in a new and extraordinary change, now includes learning about Libya directly from Libyans. "It used to be almost an act of conspiracy to approach a foreigner," remarked Yousuf, an entrepreneur in the tourist industry, as we chatted openly in a coffee shop. "You just wouldn't dare. But things are changing, much more relaxed. We have many problems, but at least now we can talk."

Hitham, an air-conditioning engineer who works at a health spa in Al Ujaylat, close to the Tunisian frontier, certainly qualifies as an informed observer on the subject of repression, for he is an Iraqi—one of the vast diaspora of professionals who have left the ruined state of Saddam Hussein in search of a better life.

Sitting outside the health spa, the Iraqi appeared far more cautious than the affable Yousuf about talking with a visitor from the West. But finally he broke his silence to draw an implicit comparison with his home country: "I came here as a stranger, but nobody asks me, even at midnight, 'Where are you going?' When I go to Banghazi, Surt, or Al Bayda, nobody, no police, asks me, 'Who are you, what are you doing?'"

Roaming Libya, I certainly found few impediments, beyond the semi-functional telephone system and a baroque bureaucracy, placed in the way of contact with ordinary Libyans, naturally friendly and prone to shaking hands with perfect strangers in the course of an elevator ride.

Accompanying new attitudes toward open communication is a theme

SAFE ZONE

Preserved since the 12th century, a fortresslike treasury, honeycombed



with vaults, provided the villagers of Kabaw a place to hide grain from desert raiding parties.



that resonates throughout the Arab world—acceptance of modern values that conflict with the tenets of traditional Islam. Before the revolution Libya was a deeply conservative Muslim society—the majority of the population shocked by the decadent habits spread by foreign occupation and the oil boom. Women in public places were almost invariably invisible behind the all-encompassing traditional white *furushiya*, and the number of female university graduates amounted to just 35. Today, the furushiya has all but disappeared, and the number of women graduating from universities exceeds that of men.

Qaddafi, famous for his interest in promoting women, has also seen to it that they find their place in traditionally male occupations. One blisteringly hot summer afternoon in Tripoli, I sat on a dais overlooking a barracks square. Beside me sat a row of senior officials in sport shirts and slacks (only the minister of the interior was wearing a suit). We were on hand for the graduation ceremony of the Libyan Women's Police Officers' Academy, class of 1999. As a verse from the Koran echoed from loudspeakers around the barracks square, the green-uniformed ranks of teenage girls in front of me hefted their automatic rifles and snapped

Alone with the wind, Berber men, members of a once dominant pastoral people, prepare for evening prayers in the Nafusah highlands. The message "Welcome," spelled out on the hillside for a folklife festival, signals an awakened desire for Western tourists. Chance attraction along a desert road, young Farhad (right) advertises an easy-going lizard for sale.



smartly to attention. Green flags fluttered in the breeze, and the white-uniformed girls' military band struck up the national anthem:

I with my beliefs and my weapons will sacrifice myself
For my nation as the light of the truth shines in my hand. . . .

Once the last strains had died away, academy commandant Col. Mohammed Amiel stepped up to the microphone. "My daughters, now you participate in serving our country. Our task is to maintain public security, and that can only come with revolutionary action. You have to be aware of the Leader's support in getting you here. We salute our Leader!" he shouted. A high-pitched chorus of revolutionary slogans arose from rows of the graduates' younger siblings in the bleachers beside the dais.

By the time night fell the guns had disappeared, and the graduates—combat boots exchanged for high heels or modish platform shoes—were clustered happily around tables that now covered the parade ground. The party ended near midnight, but the streets were still crowded. Traffic hummed along the highways and overpasses (there is one vehicle for every seven Libyans) past the endless rows of apartment blocks in which most of the cityfolk are housed. In the center of town the open-air café on Green Square opposite the floodlit Red Castle, once the fortress of Tripoli's Turkish governors, was crowded with men talking, sipping coffee, playing cards. Sweet-smelling clouds of apple-flavored tobacco drifted from their water pipes out across the sidewalks. The only woman in the establishment was the Moroccan waitress who brought me my coffee.

Thousands of Moroccan women, from a poorer but more liberated society, arrived in the 1980s to become the waitress class of Libya. Many, however, turned to prostitution, a service previously in short supply. There is a widespread rumor that this trend was encouraged by the government in an effort to relieve the sexual frustrations of the male population without jeopardizing the virtue of local women. "It backfired," said a friend, his voice sinking to an uncharacteristic whisper. "When times got hard, poor Libyan women realized how much these ladies were making and followed suit. It's something no one wants to talk about."

"THE OUTSIDE WORLD THINKS THAT THIS COUNTRY CONSISTS OF A MAN AND A DESERT, BUT WE ARE MORE THAN THAT."



Away down the coastal road, on the dark beach beyond the seawall, groups of young people huddled on blankets, passing soft drink cans to each other in a manner that suggested they contained something stronger than Pepsi—alcohol does not appear to be in as short supply these days as it was 30 years ago. Nor are the penalties for violating prohibition that severe, at least in comparison with other "dry" Muslim countries like Saudi Arabia or Iran.

"A first offender gets a year's suspended sentence and a fine," stated Shawki, who, as a veteran judge, is in a position to know. "Heroin is the big problem now, especially among students and young people," he continued, echoing a striking confession made by Qaddafi himself in 1996: "We have lost our youths."

Official figures on this topic are hard to come by, but according to a report from the government department in charge of the "fight against atheism, drugs, and hallucinogens," between 1997 and 1998 the Libyan police seized, in addition to almost 20 pounds of heroin, over three-quarters of a ton of hashish, more than 90,000 pills, likely amphetamines, and some 300 pounds of cocaine.

One morning, waiting in a Tripoli courtroom for the day's session to begin, Shawki was explaining that half the criminal cases that come before the courts concern drugs. As he spoke, the clerk of the court, wearing a loud, red-checked shirt, stood to summon us to order as a judge and two advisers, all in black robes with green sashes over open-necked shirts, took their places. A group of young men were led into a barred enclosure and their handcuffs removed, and we got down to business. Shawki, recently retired, sat with me in the well of the court, offering clearly audible comments on the cases being heard by his former colleagues sitting above us on the bench.

Abdul, the first defendant, charged with possession of heroin, was pleading not guilty. His lawyer argued that the drugs had been planted and that the police had not followed the proper procedures in their search. The judge conferred with his advisers, ignoring Shawki's loudly stated opinion to the courtroom at large that the man was "clearly guilty," and then remanded the case for two weeks.

Another heroin possession case followed, enlivened by the intervention of the defendant's father, an elderly man in a white skullcap, who advanced from the back of the court to offer his own analysis of events. The judge remanded the case for two weeks. "They will get about three years, maybe less," predicted Shawki. "Small dealers get five years, big ones, death. Mind you, if there's a hole in the evidence, they can get off."

I asked him about *sharia,* the Muslim code of justice, that applies in Libya. "According to sharia, the penalty for theft is the amputation of a hand," he answered. "That's the law here, but the doctors refuse." What about whipping an unmarried couple when the woman gets pregnant, also a standard sentence? Shawki's grizzled face grew serious. "It is very rare; usually the families pressure them to marry. But yes, it does happen. In fact the last case was about three months ago, in Sabha."

I thought of this grim practice strolling one evening on Gargaresh Street in southwest Tripoli; upscale boutiques and fast-food restaurants make this a favored haunt of the younger set. A ponytailed young man in an Italian designer shirt was revving the engine of his Korean car in evident hopes of attracting the attention of two girls climbing into an Isuzu. Getting no reaction, he turned up the volume of his tape player,



Lamb, olives, and fried potatoes go together for lunch at the middle-class home of a government employee in Tripoli. Until recently Libyans were discouraged from private contact with foreigners. According to photographer Reza, "Everything seemed normal: The boy talked about soccer; the girls talked about soap operas."

booming out the latest local hit over the noise of the traffic. They drove off. A few minutes later I saw both cars cruising by, nose to tail. The young man's hopes may have been raised by the stretch pants and T-shirt worn by one of the women, but her companion's hair was concealed under a head scarf, a *hijab,* in conformance with the dress code many Muslims believe is mandated by the Koran. I suddenly realized how many hijab I was seeing around me—on women driving cars, running government departments, working as doctors and lawyers.

"The government has tried to resist, but Islamic influence is seeping in; it's a real change," remarked a friend later. "Look at this." He flipped open an old book to a picture of a crowded Tripoli street, taken in the 1970s. "You don't see a single hijab on any of the women."

Qaddafi himself makes his feelings about fundamentalist Islam quite clear. Those who fought in Afghanistan and now seek to impose their views on Arab countries, including Libya, he refers to contemptuously as *zanadiq*—heretics. His attitude extends beyond forceful language. Islamic activists have been rounded up and jailed by the score. An armed fundamentalist uprising in the east of the country in 1996 was harshly and summarily repressed.

Yet traditional attitudes, particularly with regard to the rights of women, persist in society at large—to the Leader's irritation. When the General People's Congress, Libya's version of a parliament, voted to withdraw the requirement for a husband to get his wife's permission before marrying a second spouse, he erupted in fury, both at the Congress and at women for not using their right to speak out. "Your education is a waste of time. You are like furniture," he told a meeting of women shown on Libyan TV (which sometimes has its moments). "From now on, any law or measure connected with half of society that is decided in the absence of women is null and void," he declared, tearing up a text of the amended law and storming out of the meeting hall.

ACTIVE FAITH

Drumming and chanting intensify at a mosque in the oasis town of

Ghadamis as Sufi mystics fall into a trance to bring themselves closer to Allah.

Shielded from the Saharan sun, a dance troupe performs on the site of a former slave market in Ghadamis. Provided with modern dwellings, many villagers still return in summer to their old thick-walled homes to keep cool. The rough, unlettered stones of a Muslim cemetery (bottom left) bake under the searing African sun, which makes an umbrella bloom (below).

In the palmy days of the '70s and '80s almost the entire working population in Libya was on the government payroll. The flow of oil revenues had ensured that the vast bulk of the population lived comfortably, even if no one put in much effort at their nine-to-two jobs before going home to sleep. Housing was practically free, and the government threw up endless apartment blocks and modern houses for all who needed them. Water and electricity came without charge. This unbounded largesse was already being trimmed back in the late '80s, but the sanctions, while not savage enough to cause misery on the scale of conditions in Iraq, brought harder times. Soon there was a black market price for the Libyan dinar, which had long enjoyed rock-solid stability, and it started to slide.

"Government salaries were frozen," recalled Yousuf, the tourism entrepreneur, as we drove out one morning across the farm country inland from Tripoli, passing groups of foreign laborers squatting at crossroads as they waited for work. "Meanwhile, prices started to go up—for food, clothes, everything. Of course the government subsidized essentials, but without that ration system some people would have gone hungry. At the same time the government made it easier to do business."



An optimist, Yousuf saw himself as the beneficiary of a change in the system by which individual initiative was at last being rewarded again. "I used to work for the government, but I resigned because my salary was becoming worthless. Now I not only support myself well with my own business, I am even building a house," he said, pointing up the irony of sanctions actually having had productive consequences.

The tourism business is indeed an area where the embargo has produced positive changes. As the dinar slid, foreign travelers bearing hard currency became ever more valuable, and now some 100,000 travelers a year from Europe and elsewhere are exploring this unknown country. Once upon a time the people of Ghat and Ghadamis, desert towns deep in the interior, prospered by providing shelter, protection, and guides for the trans-Sahara caravan trade, which consisted mostly of slaves. Today their descendants have adapted to escorting four-wheel-drive caravans of European tourists along the same ancient desert routes.

While some greet the commercial possibilities of the growing stream of foreign visitors, others are capitalizing on Libya's one really big business: oil. In a secluded office building in southwest Tripoli, Abdullah Ashour, a burly, ebullient oil engineer who learned his trade in Houston, Texas, is busily superintending the affairs of TOCS, the oil service company he helped found in 1997. His office walls are festooned with spiderweb diagrams of pipelines and pumping stations, and he discourses fluently in oilman's jargon about wire line units and gate valves. "The oil," he says, "was found by Americans, so we talk American, we use American equipment. We never stopped dealing with Americans," despite U.S. sanctions that forbid U.S. firms to operate in Libya. "The Americans are very clever. They did not go away; they went from the door to the



Oil and water do mix in Libya's recipe for economic progress. A Vietnamese laborer (above) endures the Sahara's sting as he helps lay pipe in the Al Sharara oil field. Oil provides 95 percent of Libya's export earnings. Fresh underground water will pour through a new section of the Great Man-Made River (far right), a projected 2,500-mile pipeline from desert to coast.

window." Smiling, Ashour reels off the names of a number of corporations that shifted their Libyan business to European subsidiaries and carried on as before.

Also flowing under the desert these days is a supply of fresh water that before the Great Man-Made River project began in 1984 was unavailable to the thirsty fields and cities of Libya's coast. To the amazement of many in the outside world, this pet project of Qaddafi's—a network of massive 13-foot-wide underground pipelines, some as long as 740 miles—has so far been a success. Clean, sweet water flows steadily down the gentle south-to-north slope of the Sahara to emerge finally from long-idle taps in Tripoli and Banghazi.

One of the great pipeline's earliest destinations was Surt, Qaddafi's made-to-order capital at the base of the Gulf of Surt, close to the Leader's birthplace. Mustafa, a professor at Tripoli's vast Al Fatah University, offers a cynical interpretation of this plan. "In this sort of project you usually move the water to the people. Sometimes you might want to move the people to the water. But Qaddafi wanted to move both the



water and the people, or at least all the government workers, from Tripoli to Surt, which was hardly more than a desert village before."

It didn't work. Surt has indeed sprouted into a concrete landscape of apartment buildings and vast government office buildings, with an occasional weather-beaten café or tire-repair shop serving as a reminder of its former role as a stop-off on the coast highway. But the city is strangely empty. The vast mass of bureaucrats found excuses to delay their departure from Tripoli or, if forced to move, left their wives and families behind and return at every opportunity.

Exploring the sterile expanses of Surt one day, I came upon two officials whiling away the time in a hotel coffee shop. One of them had been summoned from Tripoli to meet with the Leader, who at the last minute had decided to go to Egypt instead. Condemned to a wasted day, this official had persuaded his friend, who held a post in the foreign ministry, to postpone his own return to Tripoli.

As we chatted, the friend's cell phone kept ringing with desperate phone calls from foreign envoys in Tripoli (none of the embassies have moved) requesting urgent meetings. "I am so sorry," he would reply smoothly. "I am detained in Surt on important business. I will contact you immediately when I return."

Today, on Green Square in Tripoli, a coffee shop stands on the site once occupied by a fine turn-of-the-century Italian palazzo. "That used to be the office of the Libyan prime minister," explained Mustafa, the professor. "Then one day the Leader noticed that every time he phoned the prime minister's office in Surt, he was told that the prime minister was visiting Tripoli for the day. When he discovered that the prime minister had never moved to Surt at all, making only quick trips there when he had to, Qaddafi ordered up the bulldozers and had the place demolished that afternoon."

In his collection of stories and essays, *Escape to Hell and Other Stories*, Qaddafi conveys his deep distaste for cities and other

MORE ON OUR WEBSITE

Photographer Reza describes this story as his most "difficult field assignment ever." Why? Find out at **nationalgeographic.com/ngm/0011**.

"THE OIL WAS FOUND BY AMERICANS, SO WE TALK AMERICAN, WE USE AMERICAN EQUIPMENT."



manifestations of what he sees as the barren materialism of Western urban culture: "Life in the city is merely a wormlike biological existence where man lives and dies meaninglessly." However, as he told me in the house in Al Bayda, *jahannam*—Arabic for "hell"—is also the name of an area in the desert close to Surt and to his birthplace. He still spends time there. "The desert climate gives me a chance to think. When there is a lot of work, I escape to hell." He laughed, displaying an author's pride at the play on words.

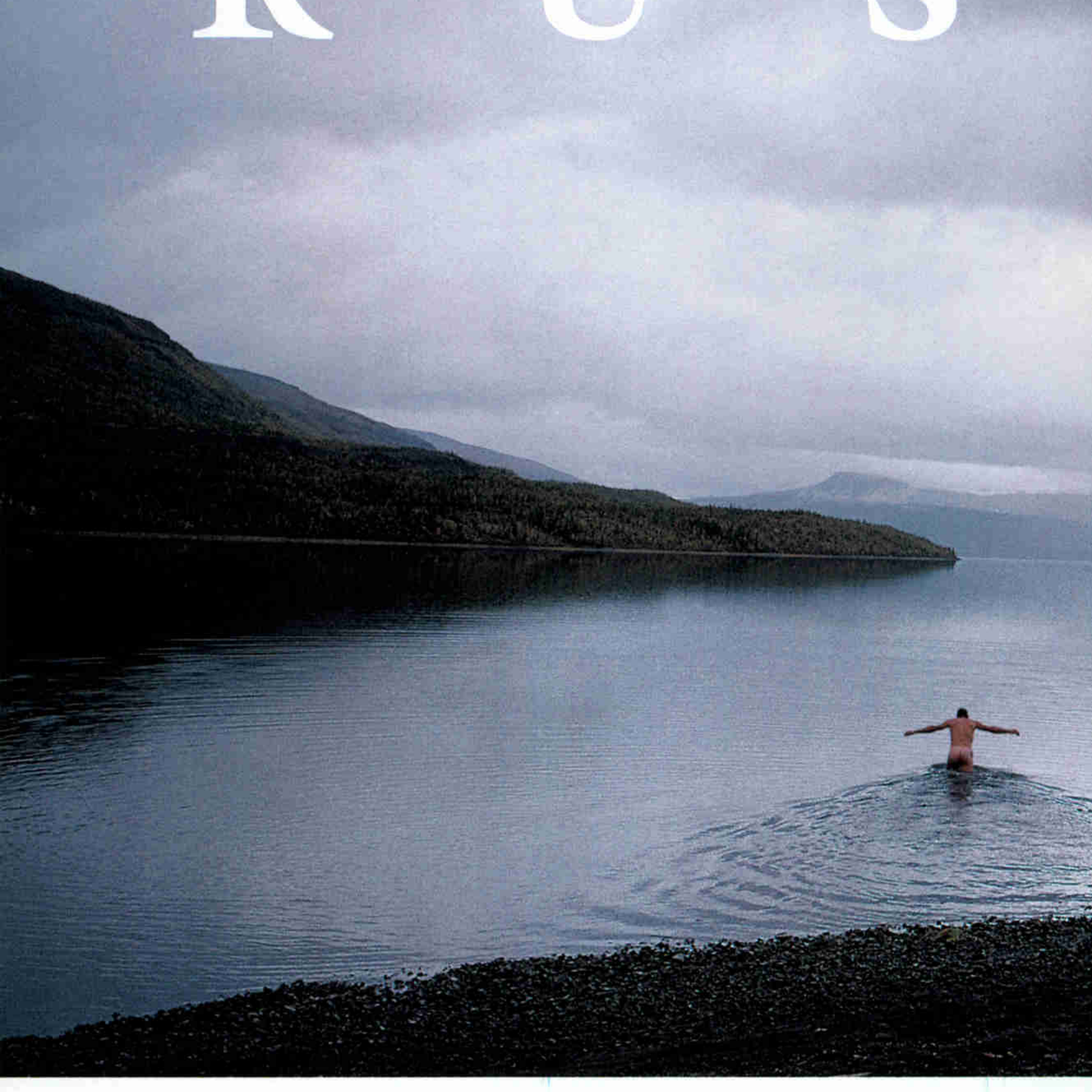
Conscious of the widespread perception in the West that the old rabble-rouser has changed his spots, abandoning his youthful plans to transform society, I inquired if he was still a revolutionary. He gave a chuckle and an emphatic "yes," and then observed that although he is "really satisfied with what we have done in 30 years," there is "still room for improvement." Eventually he moved slowly off to bed, to rest up for the new and uncertain days that are dawning over Libya. □

Striking a prophet's pose outside his desert tent, Muammar Qaddafi hopes to reinvent himself as a world statesman. Citizens and neighboring states will applaud if the new stance brings long-desired stability.



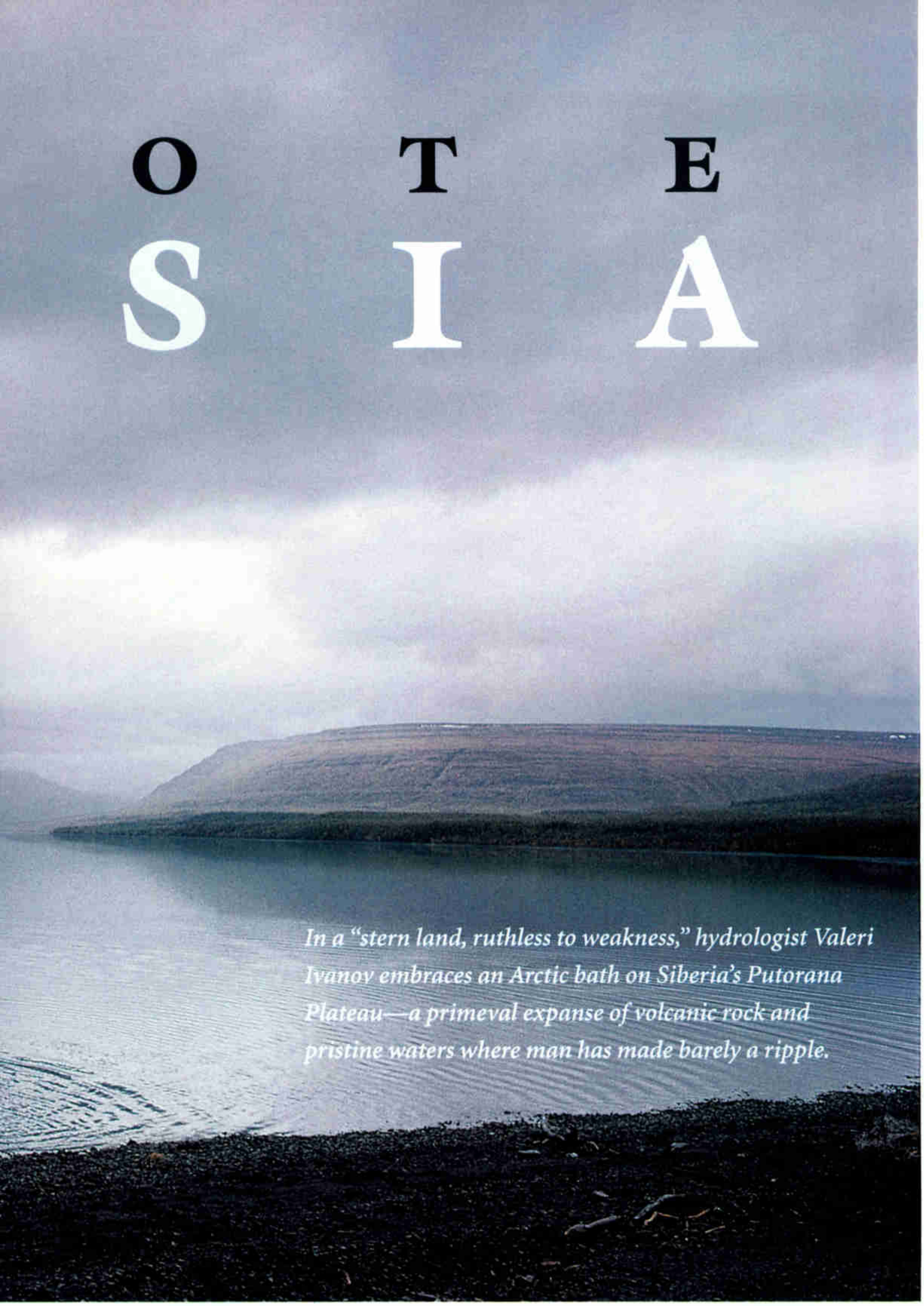
R E M

R U S



EXPEDITION TO THE

BY FEN MONTAIGNE



In a "stern land, ruthless to weakness," hydrologist Valeri Ivanov embraces an Arctic bath on Siberia's Putorana Plateau—a primeval expanse of volcanic rock and pristine waters where man has made barely a ripple.

PUTORANA PLATEAU

PHOTOGRAPHS BY RANDY OLSON



THE VIEW WAS MAGNIFICENT—mile after mile of flat-topped mountains receding to the Arctic horizon—though it was difficult to appreciate if you were on your hands and knees on the side of one of those plateaus, clinging to shards of scree. Vasily Sarana, the 33-year-old chief of the Russian Geographic Society's Putorana expedition and a mountaineer who seemed capable of bounding up vertical walls, was not in such an undignified position, however. Standing tall, he turned around on the vertiginous slope and scanned the horizon of his favorite corner of Russia—the Putorana Plateau, a wild, uninhabited tableland the size of Nevada, cut by canyons, rivers, and waterfalls. We were 200 miles north of the Arctic Circle in early September. Snow had fallen in the night, throwing into sharp relief the striated flanks of nearby plateaus.

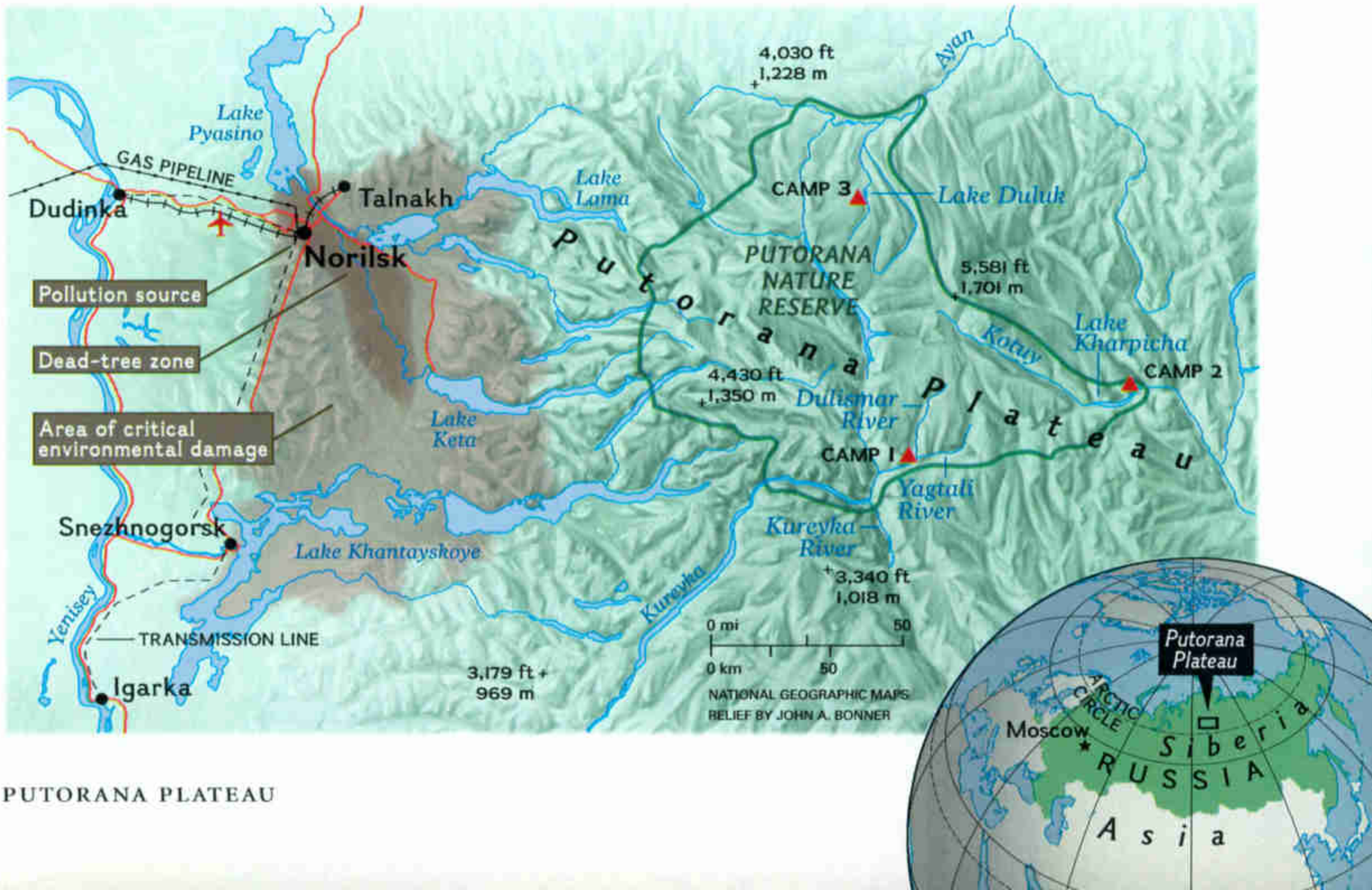
Sarana and I were searching for Putorana snow sheep, as we had been for nearly two weeks, with no success. The sheep, *Ovis nivicola borealis,* are rare—estimates range from 2,500 to 6,000 in all—and among the hardiest of animals. The biggest rams weigh up to 220 pounds and have thick horns shaped like commas. Both rams and ewes are clothed in a gray-brown wool that provides extraordinary insulation on the plateaus, where winter temperatures plunge to minus 85°F.

The sheep's fondness for end-of-the-Earth locales led me to this precipitous slope, struggling to find a way up without somersaulting 600 feet down a field of jagged basalt rocks. When Sarana and I at last reached the top of the mesa, we were confronted with a bleak winter scene—an expanse of treeless plateau whose surface was studded with snow-covered boulders. It was hard to believe that anything could inhabit this moonscape.

"Winter has arrived," said Sarana, and, bracing against the frigid wind and spitting snow, I had to agree. "The moose and wolves will live in the valley now, but the sheep will stay up here. It will be a real battle for survival." The Putorana sheep spend the winter on the plateau tops, where high winds sweep away the snow, exposing grass and other plant food.

Sarana began scouring the ground for sheep sign. He soon found what he was looking for—the distinctive two-pronged tracks, the piles of

Steel nerves *and a stout log forge a makeshift bridge over roaring falls on the Yagtali River. Eons of rain and snowmelt have etched steep canyons into this roadless plateau—one of the world's largest lava fields, laid by eruptions some 250 million years ago.*



PUTORANA PLATEAU

"Roughing it" *is redefined by Putorana's unpaid team of explorers, who rely on lung power to top off a battered raft that serves as transport, fishing boat, and hydrology lab. "We're running on enthusiasm," says expedition leader Vasily Sarana (below, at center). Helicoptered to remote camps for a month each year, they fish and forage, swat mosquitoes, endure blizzards, and scale hills of jagged scree to chart terrain Sarana calls beautiful, pure, and unknown.*





pebbly scats, and a cluster of indentations where sheep had rested. Excited, he hustled to the edge of the plateau. He scanned the ledges and promontories below, where the sheep often feed, then studied the plateau that lay a half mile away across a deep valley. Nothing.

PICK UP A MAP of Russia, point to the center of the enormous country, then drag your finger north to a blank spot in central Siberia not marred by the names of towns or villages. This is the Putorana Plateau. Though its topography is reminiscent of the plateaus and mesas of America's Southwest, Putorana is no desert. It is criss-crossed by scores of unspoiled lakes and streams teeming with arctic grayling, char, and other fish. Its valleys are thick with long-lived larch trees that shelter brown bear, moose, wolverines, and great herds of migrating reindeer.

Part of Putorana was designated a nature reserve in 1988, and at 7,290 square miles it is the fourth largest of Russia's 134 reserves and national parks. The roadless upland's only inhabitants are a half dozen wardens who live there up to ten months a year.

Over the past century several waves of explorers and scientists have studied Putorana, and in the latter decades of the Soviet era a small number of geologists, fishermen, hunters, and white-water rafters dropped in by helicopter. But the collapse of communism in 1991, followed by a sharp increase in fuel costs, curtailed these forays.

That is why Vasily Sarana and the Russian Geographic Society keep coming back: Putorana is one of the few remaining places where they can bask in the feeling of being hundreds of miles from civilization. Recalling the first time a helicopter dropped off his group and flew away, Sarana said, "It left, and we were surrounded by these mountains. The silence



was deafening. There was no one around. I can't even tell you what I felt. It was a sense of the scale, the size of our country, the sense that nature is untouched here, and if something should happen to us, no one would save us. One feels small and helpless here."

Sarana's ragtag group of mountaineers and adventurers, some of whom use their alpinist skills to cobble together a living in Moscow washing windows and making repairs on tall buildings, operate on a wing and a prayer, scraping together corporate donations and hitching rides on scarce helicopters.

In addition to observing and photographing the snow sheep, the expeditions—joined by visiting Russian scientists—are trying to augment the scanty knowledge of the plateau. They have cataloged and analyzed the 20 or so small glaciers in Putorana; mapped and photographed some of the hundreds of waterfalls; measured the depths and acidity of lakes and rivers; observed the rare gyrfalcon, which nests in the sheer basalt cliffs; and collected samples of mosses, lichens, and flowers.

To reach the heavenly precincts of Putorana, you must first pass through an Arctic version of hell: Norilsk. Founded in 1935 as part of Stalin's gulag, Norilsk grew into a sprawling metallurgical center in which an estimated 350,000 political prisoners toiled in mines. The forced laborers are long gone, but the gigantic nickel and copper smelters and the surrounding nickel mines are still working. Today the city is home to 200,000 people.

From the air Norilsk looks like a city on fire, with plumes of brown and gray smoke belching forth from dozens of smokestacks, merging into a thick pall that blots out the sun and can be seen from 50 miles away. Norilsk pumps out 8 percent of all the air pollution in Russia—more than two million tons of pollutants a year, mainly sulfur dioxide, according to Vitaly



ARCTIC OUTPOST



Faded reminder *of times past, Mikhail Gorbachev adorns the rough-hewn boards of a sauna. Such huts were once used by Soviets flown in to hunt and fish. The collapse of communism and Russia's economy has curbed these visits, renewing the region's isolation.*

Savchenko, chairman of the Norilsk Regional Committee on Environmental Protection. In Norilsk the air fills your mouth with the taste of burnt matches. Fortunately the prevailing winds are such that this endless stream of noxious material rarely falls on Putorana, the western edge of which is just a few dozen miles from the city. And even when the wind blows toward the reserve, the upland's basalt ramparts tend to deflect the pollution.

OUR TEN-PERSON EXPEDITION took off from Norilsk in an orange-and-blue MI-8 helicopter packed with food, tents, and supplies. The day was sunny and chilly, and as we flew toward the southern edge of the tableland, we passed mile after mile of dead larch forest, part of a contaminated zone extending southeastward 75 miles from Norilsk.

But soon we were over Putorana. Patches of snow dotted the brown plateaus. Canyons and ravines were etched in the landscape like cracks in an elephant's hide. Putorana was created 250 million years ago by a process known as plume volcanism, in which a huge body of magma rose to the surface from 1,800 miles inside the Earth, then erupted through fissures to form a blanket of basalt 10,000 feet thick. Over millions of years cracks in the rock filled with water, forming the rivers and long, narrow lakes that distinguish the region today. Some scientists believe the enormous quantity of magma, ash, and gases released during the creation of Putorana may have drastically altered Earth's climate, playing a role in the so-called great dying, the largest mass extinction ever, which killed off perhaps 95 percent of all ocean species and 70 percent of all land vertebrate families.*

After a two-hour flight we arrived at the first of the three camps we would be lifted into, this one in central Putorana at the confluence of two rivers, the Dulismar and Yagtali. Stepping

*See "When Life Nearly Came to an End," by Hillel J. Hoffmann, NATIONAL GEOGRAPHIC, September 2000.

Russian retriever *by necessity, mountaineer Anatoly Kayukov tosses lunch ashore. ("The dog refused to enter the cold water," he says.) Teal and snipe felled by teammate Vladimir Kruger (right) flesh out a diet of fish, mushrooms, berries, and ample rations of vodka.*





out of the helicopter, we inhaled the cool, sweet air. A stone's throw away a waterfall rumbled; all around plateaus rose to nearly 5,000 feet, partly covered in verdant larch. When the helicopter lifted off for Norilsk, I was struck by the same feeling Sarana had described—the unsettling thrill of being dumped into a true wilderness. But I could imagine no better group with which to be marooned than the gang from the Russian Geographic Society.

Sarana, who is studying for a Ph.D. in glaciology at Moscow State University, has been fascinated with Putorana since hearing about it as a schoolboy in Ukraine. "I was in love with the mountains, and I remember this area drew me like a magnet," said Sarana, a handsome, brown-haired man of medium height and stocky build. In 1991, after going on several Siberian expeditions, he became actively involved with the Russian Geographic Society —one of the world's oldest, founded in 1845—just as federal funding was drying up.

"I thought it was a shame that all the programs were falling apart," said Sarana, who is an unpaid volunteer for the society. "I thought that Russian explorers' traditions should continue. I live by this—traveling, exploring, discovering. Many young people were going into business and looking for ways to make money, but I wanted to remain a geographer."

Gathering together a handful of mountaineering buddies, Sarana set his sights on Putorana, terra incognita to most Russians. In 1993 he and three other men hitched a ride on a helicopter from Norilsk into Putorana, then spent six weeks floating 375 miles down rivers and bushwhacking another 125 miles. Carrying few supplies with them, they survived mainly on fish, berries, and mushrooms. They have since mounted seven more expeditions, financing them out of their own pockets and with some small corporate contributions.





Mountains of mine waste *loom over the town of Norilsk, built in the 1930s by Stalin's gulag laborers. Sprawled on Putorana's western edge, this city of some 200,000 people exists for one reason: the mining of metals. Workers smelt nickel (below) in antiquated factories that poison the air, water, and earth. "It's unbearable," says resident Vitaly Savchenko. "Winter is long here, and life is short. It's as torturous as it was under Stalin."*

Two men from the original Putorana expedition were with us this time, Vladimir Kruger and Anatoly Kayukov. Kruger, 42, is a wiry, bearded man who wore an orange bandanna and shot ducks and snipe with his 1928-vintage, double-barreled shotgun. An accomplished climber, he has scaled 23,406-foot Lenin Peak in the Pamirs on the Tajikistan-Kyrgyzstan border. He drank his share of vodka and smoked but kept a blistering pace on our climbs. He was fearless, as evidenced one evening when he spanned the high walls of the Dulismar River with a pair of logs, shinnied out on them, and lit up a cigarette while sitting 40 feet above the crashing waterfall.

Kayukov is a 40-year-old mountaineer who works for a construction company and plows any spare money into the Putorana expeditions. "I've been all over Siberia, but I've never seen nature like this," said Kayukov, a well-built man with thinning blond hair. "Putorana was all I had dreamed of. This is one of the few such places on the planet. It's probably very hard to find a place this big that is practically virgin."

Our expedition included Sarana's wife, Katya, and Nikolai "Kolya" Anisimov, a 43-year-old mountain climber, natural-born poet, and physical fitness aficionado. Nearly every day the deep-voiced Anisimov would stand in our camp—framed by Putorana's massive plateaus—and boom out verses, such as the following, which he attributed to miners who worked in the harsh Siberian Arctic:

We're not afraid to down nine shots of vodka,
or eat cabbage pickled in permafrost.
For you see, we're the guys,
we're the guys,
of the 70th parallel!

Also with us were Gennady Shklyarik, a geologist from the Norilsk nickel plant; Valeri Ivanov, a 23-year-old hydrologist from Moscow State University, who bathed in the frigid



PERILOUS SKIES



Bits of whimsy *defy a dismal view of Norilsk's smelter stacks, which spew two million tons of sulfur dioxide each year. Though Putorana is largely spared by favorable winds, acid rain from such emissions has killed the trees for 75 miles southeast of the city.*

rivers morning and evening; and Tatyana Karimova, a 32-year-old botanist, also from Moscow State University.

WE SPENT a week at the Yagtali. Ivanov mapped a ten-mile stretch of the river and took water samples. Some of us hiked through the surrounding forest and plateaus, discovering waterfalls and signs of wildlife: fresh moose tracks, bear scats, and the remains of reindeer killed by wolves.

The only evidence of man was the reindeer corrals and sable traps laid by the Evenk and Dolgan, aboriginals who inhabited this land for millennia before collectivization disrupted their traditional way of life. The last native people left Putorana in 1982, forsaking the rigors of migratory life to work in state reindeer-hunting collectives or to settle in towns in northern Russia.

As an angler, I was astonished at the abundance of arctic grayling in the Yagtali. These exquisite fish, with their sail-like dorsal fins, milled around by the score in deep pools below the waterfalls. I caught my share on a fly rod, and Gennady Shklyarik, who has spent a dozen years on geologic expeditions in the Russian Arctic, turned them into a delicious dish of raw fish marinated in vinegar, salt, and pepper.

"Grayling," he said, "have fed the whole Russian north."

Moving on to the eastern reaches of Putorana, we touched down in the swampy grass next to Lake Kharpicha. As I walked away from the MI-8, I took in the panoramic view: The lake, about two miles wide and eighteen miles long, was surrounded by plateaus, the larch trees on their slopes already turning gold. To the west, where the Kotuy River flowed into the lake, was a wide plain, with buttes and mountains in the far distance. We set up camp in a log cabin used by fishermen during the Soviet years. An old boat shed and rusted fuel drums littered the landscape.



Water spills *over the lip of a dramatic cut in this land of lichen-covered basalt. Over time, cracks in Putorana's lava field filled with water to form the region's rivers and lakes. By lamplight Valeri Ivanov checks samples of area waters, which seem so pure that he and his colleagues drink them "neat."*

The surrounding mountains were prime snow sheep habitat, and Sarana wanted to spend a week searching for the animals. For the first three days a steady, cold rain fell, making climbing treacherous and confining us to the lakeshore. When the rain finally stopped, Sarana led a small group to the top of the plateau behind our camp. Following a reindeer trail, we wound our way up the steep, boulder-strewn slope. As we emerged from the tree line, we were treated to a view of the dark waters of Lake Kharpicha. But no snow sheep.

The next morning we awoke to find that snow had fallen on the plateaus. The lake was black and dead calm. A fine white powder was sprinkled over the sides of the mountains, the



tops of which were shrouded in clouds. We had been in Putorana two weeks, and the place was starting to seep into us all.

"Here your way of thinking changes," said Kruger. "At home you worry about a lot of little things, like leaky faucets or fixing the car. You run around like a windup toy. Here you start thinking clearer."

OUR LAST CHANCE to find snow sheep came at our third and final camp, located on Lake Duluk, a narrow three-mile-long body of water wedged between two towering plateaus in the north of Putorana. In the early 1990s the nature reserve established a sheep observation station at Duluk, but budget cuts had closed it down. By the time we arrived, on September 4, the peak of autumn had passed, and the needles on the larch trees had turned a drab straw color and were falling off in profusion. Sarana said the Duluk area held a large concentration of snow sheep, and I could see why: It was the most rugged, forbidding terrain we had yet encountered.

On our second day of scouting, when Sarana painstakingly led me up the scree-covered side of a plateau, we found abundant evidence of sheep but no sheep themselves. With darkness approaching, we were about to scramble back down when he abruptly motioned for me to kneel. About a hundred yards below, I saw two brown-and-white rumps disappear over a rise.

We crawled to a rocky hillock. Slowly I raised my head, and there, not 50 yards away, stood three ewes and a lamb. Their dun coats were a perfect camouflage against the somber brown flanks of the plateau. They were munching on grass, but the largest female—perhaps 110 pounds, with short, thick horns—was wary. I lowered my head, and when I looked up again, she stopped chewing. I froze. For more than a minute man and sheep locked eyes. Then with a nimble step she led an unhurried retreat to basalt outcroppings so precarious that not even a wolf could follow.

Elated, Sarana and I raced the darkness back to camp. The next morning, convinced that we could find still more of the animals, Sarana organized a small group to return to the same area. It was cold and gray when Anisimov, photographer Randy Olson, Sarana, and I set off, following a narrow, swiftly flowing river to the west.

We humped to the top of the plateau and were met head-on by a biting wind. Seeing no sheep, Sarana grabbed Olson's telephoto lens, placed it on a tripod, and scanned the opposite plateau, whose massive flank presented variegated shades of brown earth, gray scree, white patches of snow, and yellow swaths of grass. After a minute or two Sarana held the lens still. I could see nothing with my bare eyes, but when I peered through the lens, I saw a big brown lump—a ram lying on a grassy incline. Turning the lens on another broad, grassy area, Sarana located four more sheep, all rams.

We scurried down one slope, clambered up another, and headed for the sheep that had eluded us for weeks. Crawling to a low basalt wall, Sarana motioned for Olson and me to follow. He pointed out several big rams grazing about 200 yards away. Spread out on a gentle slope with a 360-degree view, the sheep would be difficult to approach.

We circled around to the top of the plateau, hoping to creep up on the animals from above. I took a position in a boulder field, and Olson hid behind a rock about 150 yards away. Five rams were grazing, and one was lying down, his white rump plainly visible. Now and then the sun emerged from behind thick clouds, throwing columns of hazy light across the landscape.

Olson crept forward, hoping for a good picture. When he closed to about 75 yards, the rams spotted him. Leaning uphill, their powerful torsos taut with alarm, they stood like statues. Just then I noticed three more sheep climbing in my direction. I lay motionless on the boulders. Up they came, two ewes and a lamb, oblivious to my presence. At about 30 feet the ewes saw me and stopped. They looked straight at me. I admired their fluffy dark coats, their V-shaped white noses, their brown eyes. They lingered nearly a minute before scampering toward the top of the plateau.

When Olson was 50 or 60 yards away, the rams bolted downhill for the safety of some cliffs. I hustled after them, scanning the basalt escarpments, streaked with snow. I looked up the valley, where Putorana's plateaus rolled like waves to the horizon.

The sheep had vanished.

On our next-to-last night in Putorana, the

Treeless hillsides *prove an austere haven for Putorana's snow sheep, a rare species that relies on wind to sweep snow from edible grasses. Wolves and avalanches pose greater threats than hunters to these animals, about which—like this unforgiving land—there is still much to be learned.*



Arctic displayed its wonders. But first, as we sat outside at a makeshift wooden table eating Kolya Anisimov's signature dish of rice pilaf and downing vodka (bottles stashed for weeks kept appearing on the table), Sarana screamed and dashed up a slope behind me. Turning, I saw flames leaping out of his tent. A stove had set the fabric on fire. Sarana managed to rescue his beloved Siberian husky, Lama, from inside the tent, and we stomped out the flames.

"It's only a tent," someone said, and the toasts continued.

Next, the seemingly fixed Putorana clouds cleared, revealing a sky shimmering with galaxies and stars.

We drank to the heavens.

Just before midnight Gennady Shklyarik, the geologist, looked up and pointed out a pale green glow. Sheets of ghostly green light flickered and danced, playing across the entire sky. "Aurora borealis," someone said. At times it looked as if an enormous light was flashing overhead. At other times shafts of ephemeral white and green light shot up like volcanic eruptions from behind the plateaus, illuminating the hard black lines of the mountains. The display continued for nearly two hours. When it ended, the polar veterans gathered around the guttering campfire pronounced it the most spectacular they had ever seen. □

MORE ON OUR WEBSITE

For field notes from Russia's Arctic outback by Fen Montaigne and Randy Olson—and more of Olson's photos—visit **nationalgeographic.com/ngm/0011**.

Photographer
Carsten Peter
Goes

TO HELL

He, author
Donovan Webster,
and a team of
explorers trek to
the South Pacific
island of Ambrym
to document its
fiery craters.

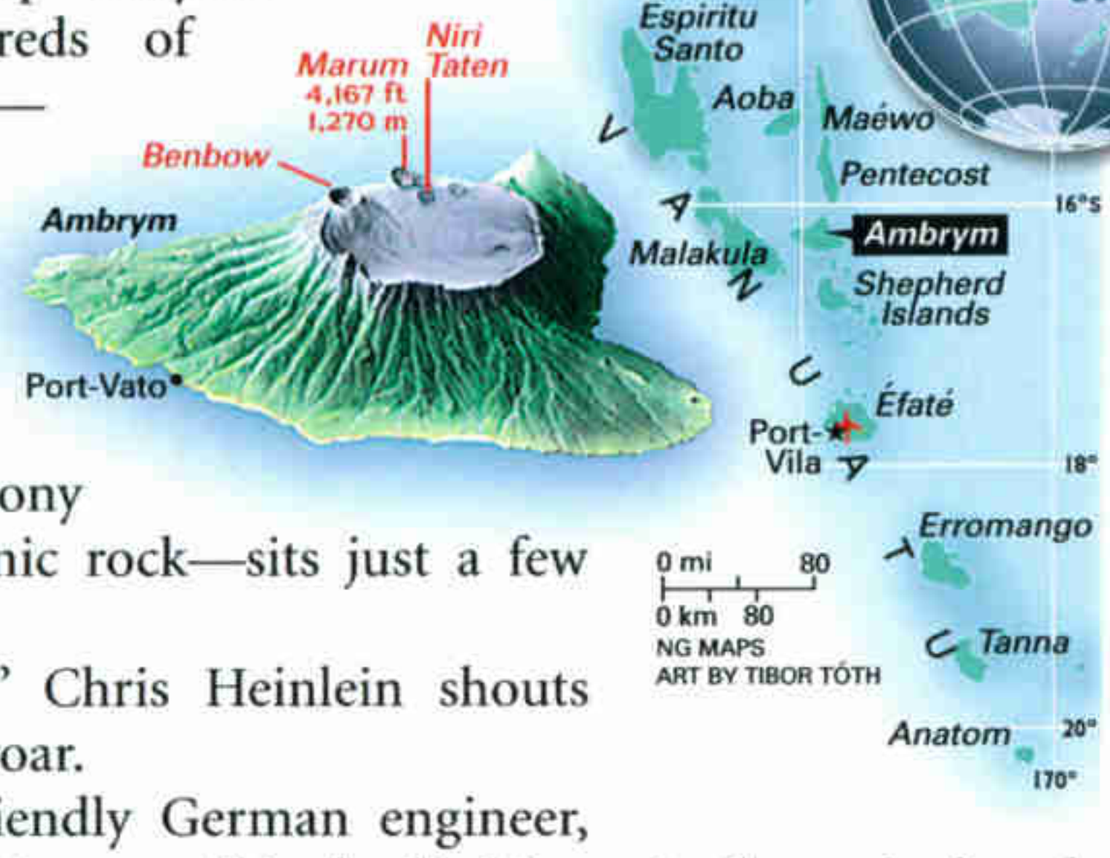
Earth is infernal near the edge of a lava lake in the Marum crater. Gases bursting to the surface launch molten bombs, then take shape as *noxious clouds*.

THE VOLCANO'S SUMMIT IS A DEAD ZONE,

a cindered plain swirling with poisonous chlorine and sulfur gases, its air further thickened by nonstop siftings of new volcanic ash. No life can survive this environment for long. On the ash plain's edge, always threatening to make the island an aboveground hell, sit two active vents, Marum and Benbow, constantly shaking the earth and spewing globs of molten rock into the air. Yet across the black soil of the plain come all nine of us, a team of explorers, photographers, a film crew, a volcanologist, and me. We have hacked through dense jungles on this island called Ambrym, one of some 80 islands making up the South Pacific nation of Vanuatu, and entered this inhospitable landscape to camp

Veteran volcano explorer Franck Tessier descends into Marum, coming within 150 feet of lava as hot as 2200°F. He and his wife, Irène Margaritis, have gone deeper into this crater than anyone before.

and explore for two weeks. We've tight-roped up miles of eroded, inches-wide ridgeline—with deep canyons plummeting hundreds of feet on either side—to totter at the lip of the volcanic pit of Benbow. The pit's malevolent red eye—obscured by gases and a balcony ledge of new volcanic rock—sits just a few hundred feet below.



"OK, your turn," Chris Heinlein shouts above the volcano's roar.

A sinewy and friendly German engineer, Heinlein hands me the expedition's climbing rope, which leads down, inside the volcano. Clipping the rope into a rappelling device on my belt—which helps control my descent—I step into the air above the pit.

A dozen feet of rope slips between my gloved fingers. I lower myself into the volcano. Acidic gas bites my nose and eyes. The sulfur dioxide is mixing with the day's spitting drizzle, creating a sulfuric-acid rain so strong it will eat the metal frames of my eyeglasses within days, turning them to crumbly rust. The breathing of Benbow's pit is deafening, like up-close jet engines mixed with a cosmic belch. Each new breath from the volcano heaves the air so violently my ears pop in the changing pressure—then the temperature momentarily soars. Somewhere not too far below, red-hot, pumpkin-size globs of ejected lava are flying through the air.

I let more rope slip. With each slide deeper inside, I can only wonder: Why would anyone *do* this? And what drives the guy on the rope below me—the German photographer and longtime volcano obsessive Carsten Peter—to do it again and again?

We have come to see Ambrym's volcano close up and to witness the lava lakes in these paired pits, which fulminate constantly but rarely erupt. Yet suspended hundreds of feet above lava up to 2200°F that reaches toward the center of the Earth, I'm also discovering there's more. It is stupefyingly beautiful. The enormous noise. The deep, orangy red light from spattering lava. And those dark and brittle strands called Pele's hair: Filaments of lava that follow large blobs out of the pit, they cool quickly in the updraft and create six-inch-long, glassy threads that drift on the wind. It is like nowhere else on Earth.

Our first night on Ambrym we make camp in a beachside town called Port-Vato at the base of the 4,167-foot-high volcano. Shortly after sunrise the next morning, at the start of a demanding hike up the side of the volcano—walking a dry riverbed through thick jungle—I try to extract Peter's reasons for coming. As we crunch along the floor of black volcanic cinders, scrambling over shiny cliffs of cold lava that become waterfalls in the rainy season, Peter, 41, is grinning with excitement.



Overhead dark silhouettes of large bats called flying foxes crease the morning sky like pterodactyls.

"I was 15 years old and on vacation in Italy with my parents. They took me to see Mount Etna," he says. "As soon as I saw it, I was drawn to the crater's edge. I was *fascinated.* My parents went back to the tour bus. They honked the horn for me to come—but I couldn't leave. I edged closer, seeing the smoke inside, imagining the boiling magma below. At that moment I became infected."

Since then Peter has traveled the world examining volcanoes. His trips have taken him to Iceland, Ethiopia, Indonesia, Hawaii, and beyond. "And of course," he says, "I have been back to Etna, my home volcano, many times."

Using single-rope descending and climbing techniques developed by cave explorers and adapted for volcanoes, Peter has been dropping into volcanoes now for nearly a decade. "The size and power of a volcano is like nothing else on Earth," he says. "You think you understand the Earth and its geology, but once you look down into a volcanic crater and see what's there, well, you realize you will never completely understand. It is that powerful.

SOCIETY GRANT

This Expeditions Council project is supported by your Society membership.

The islands of Vanuatu range from lush to deadly. Geared up for the dangers of an active crater, Chris Heinlein displays one of many insects lured by the glow of lava—and doomed to die in the fumes or heat. Back at base camp Heinlein goes safely barefoot in the ash.



. . . this first afternoon we set up tents and create acid-rain-tight storage areas. The camp is a **paradise perched on the edge of disaster.**



Ahead of us Marum's volcanic pit stretches as open and clear as a visionary's painting.

At the rim Tessier and Margaritis peer into Marum. A great blast shaped the walls of the 1,200-foot-deep crater, tearing through two thick layers of lava.



Looking down Marum's incandescent throat, Tessier rests on a ledge before the final stage of the descent. He and his companions started late in the day when the air looked relatively clear, but gases soon enveloped them, cutting visibility to just a few feet.

The pit's malevolent red eye—obscured by gases and a balcony ledge of new volcanic rock—sits just a few hundred feet below.

That big." He grins. "You'll find out what I mean, I think."

After a five-hour walk uphill I get my first glimpse of that power as the expedition emerges from the steep, heavily vegetated sides of the volcano's cone and onto the caldera. In the course of a few hundred yards the trail flattens out, and the palm trees and eight-foot-tall cane grasses that lushly lined the trail behind us become gnarled and dead, their life force snuffed by a world of swirling gas clouds and acid rain.

This is Ambrym's ash plain. Seven miles across, it's a severely eroded ash-and-lava cap hundreds of feet thick. Across the plain Benbow and Marum jut almost a thousand feet into the sky.

To protect ourselves from the harsh environment, our team quickly establishes a base camp near the caldera's edge. Shielded behind a low bluff separating the caldera from the jungle, the camp stretches through a grove of palms and tree-size ferns, the black soil dotted with purple orchids bobbing on long green stalks. For the remainder of this first afternoon we set up tents and create acid-rain-tight storage areas. The camp is a paradise perched on the edge of disaster. As night falls, we eat chicken soup fortified with cellophane noodles and plan tomorrow's exploration, the volcano rumbling regularly in the background as we talk.

After dinner we follow Carsten Peter to the edge of the ash plain and watch the vents light the gas clouds, wreathing each peak in ghostly red glows. "Look there," Peter says, pointing to a third red cauldron halfway up Marum's side. "That must be Niri Taten. Tomorrow we'll start there."

All night long the rumbling keeps awakening us. Just a few miles away lava boils and the Earth roars while each of us—lying quietly in a flimsy tent—anxiously dreams of those swirling red clouds. Tomorrow night at this time, I resolve as I drift off to sleep once again, one thing is certain: It will have been a day like none I've ever had.

In the morning, shortly after a sunrise breakfast, we strike out toward Niri Taten, several miles uphill. As we follow dry and eroded riverbeds toward the volcanic cones, a gentle rain falls.

"What does Niri Taten mean?" I ask our local guide, Jimmy.

"Niri Taten is a small pig," he replies. "A small mad pig. A crazy pig. A small pig that causes trouble to men."

Haraldur Sigurdsson, one of the world's premier volcanologists, walks alongside me in the dry riverbed, examining sheer cliff faces. He points out strata of tephra, a mixture of volcanic material. By examining these layers, volcanologists can tell a volcano's level of activity. Larger and coarser tephra far from a volcanic pit means a more powerful volcano, since heavier matter is thrown farther as more explosive energy is supplied.

It's true. The closer we hike to the craters, the more the character of the riverbed beneath our feet changes from silty black grit to charcoal-size stones—not unlike old-time furnace clinkers. "Each volcano has its own chemical fingerprint," Sigurdsson says. "Each volcano's mineral and elemental content is different because of the nature of the volcano itself: its rock and the shape of its vent. It helps volcanologists a lot in their study.

"Like the Tambora eruption of 1815 in Indonesia," Sigurdsson says. "We've found Tambora ash by its particular chemical signature almost everywhere on Earth. One of that magnitude happens about every thousand years." The Tambora explosion is said to have given off so much ash and sulfur dioxide —both of which blocked and reflected sunlight—that 1816 was a "year without a summer" across much of the world. There was crop-killing frost throughout the summer in New England. In northern Europe harvests were a disaster.

Suddenly, from two miles upwind behind us, Benbow gives a huge belch. We turn to look back. "Uh-oh," Sigurdsson says. "Ashfall on the way." Instead of the usual bluish white clouds of steam and gas, the plume issuing from the cone is heavy and black, trailing earthward in a dark curtain. Slowly it drifts our way on the wind. Five minutes later the ashfall finds us, covering our rucksacks, clothing, faces, boots, and ponchos with a sandy grit the color of wet cocoa mix.

Under the ashfall we climb Marum, pressing forward through the dead volcanic soil for another hour. Each step takes us closer to Niri Taten, a crater that tunnels straight down into the basaltic rock like a massive, steaming worm burrow 200 yards across. As we approach, a rising wind and thick clouds of chlorine gas force us to pause and pull on safety helmets and industrial-style gas masks that cover our noses and mouths. Without them, between the flying bits of stone and grit carried on the 50-mile-an-hour winds and the thick clouds of gas roaring upward from the vent, time spent near the pit's lip would be painfully dangerous if not impossible.

Even with these protections the howling wind and gas often force us to shut our eyes and suspend breathing until the heaviest gas clouds pass. We lean against the high winds, brace at the crater's edge, and look inside.

Five hundred feet below, the vent's opening is obscured by rocky ledges. But if we can't see the lava itself, there is a consolation. Every inch of rocky surface inside the vent's cone is painted with color. Sunshine yellow sulfur coats some of the crater's sheer rock faces. Iron washes other sections of rock with flaming orange. Pastel green deposits of manganese glaze rock nearest the vent, like a carpet of immortal moss. Other patches of stone have been bleached white by chlorine and fluorine gases pouring from the vent.

Besides the wind and dangerous concentration of gases, the edges of Niri Taten are too crumbly to allow safe descent. Anyone climbing down a rope inside the crater could be dislodging loose boulders, some the size of cars, that could crash on anyone below. Carsten Peter pulls out his camera and long lens—whose coating immediately becomes corroded in the noxious air. The howling gusts twice knock expedition members to the ground.

After an hour it's decided that we should examine the Marum crater itself. "We can get two volcanoes in one day!" Carsten Peter says with glee. Our helmeted heads tucked down, we continue breathing scuba-diver slow into our masks for maximum benefit, and we push on.

The walk to Marum's opening isn't far, but what it lacks in distance it makes up for in danger. No matter which route you choose, you have to traverse the mountain's steep slopes, many of which are gouged with deep, unclimbable erosion gullies. We decide to cross where the gullies are smallest: along Niri Taten's knife-edged lip, within a foot of a sheer drop into the crater.

We step gingerly where the slope looks most reliable, but our footing remains dangerously slick. The slope's top layer is crumbly tephra, sometimes as big as charcoal briquettes. Making things more difficult, we've moved downwind of Niri Taten. All around us clouds of sulfur dioxide, chlorine, and fluorine gases swirl so thick they sometimes obscure our vision and force us to stop and bury our gas-masked faces inside our arms for extra protection.

It's a slog. Minutes stretch into an hour.

MORE ON OUR WEBSITE

Find Web links, additional photos with technical notes, and a complete bibliography online at **nationalgeographic.com/ngm/0011**.

"I couldn't leave. I edged closer, seeing the smoke inside, imagining the boiling magma below. **At that moment I became infected.**"

Close to the lava inside Marum, Carsten Peter takes his own picture. "I'm not posing. The reality is in my eyes—both the fascination and the fear," he says.



Every step could be our last. Finally we reach the summit of the crater's edge and begin down its other side. Protected by the lip behind us, the environment changes. Sunshine blankets the tilting black ash, and the cold gales calm into balmy breezes.

Two expedition members, Franck Tessier and Irène Margaritis, hustle downslope with me toward Marum. As we approach its lip, the 39-year-old Tessier—a genial and easygoing French biologist with impressive rope and rock-climbing skills honed by years of adventures like this one—rips off his gas mask and begins to hoot with pleasure.

I know why. Ahead of us Marum's volcanic pit stretches as open and clear as a visionary's painting. In the pit, three step-down ledges—each deeper and wider than the one uphill of it—are marbled with layers of black ash and pale, bleached basaltic andesite. The layers of lava inside the vent form as a crust over a cooling lava lake that gets blown out like a massive champagne cork when volcanic activity resumes. Small wall vents called fumaroles—created where heated groundwater and escaping volcanic gas reach the surface—let off steady plumes of steam. Inside Marum's crater it looks as if the world is being born.

And there, in the bottom of the third and largest pit—some 1,200 feet below—sits the lava lake. Its fury pushes lava through three skylight holes in a roof that partly covers the lake like a canopy. Bright orange-and-red spatters fly unpredictably from the circular opening of the largest skylight, a hole perhaps 50 yards across.

Lava is three times as dense as water. Despite its up to 2200°F heat, lava moves, burbles, and flies through the air with the consistency of syrup. Every few minutes huge molten blobs seem to soar in slow motion. A second or two later a noise from beneath the earth—a rumbling *booooom*—fills the pit and rolls across the sculpted ash plain beyond. It's mesmerizing: lava sloshing back and forth, bubbles emerging and popping like a thick stew. As we survey Marum's lip and crater, I can't take my eyes off the lava. Suddenly I understand Peter's obsession. As evening cloaks the pit's deepest recesses in shade, the lava lake and explosive bubbles glow more seductively. The spatterings glisten like enormous, otherworldly fireworks as they sail through the shadowed air.

Dangling inside Benbow's crater the following afternoon, I have time to reflect. This morning we followed the narrow ridge to Benbow's pit—which was firm enough to climb down. We fixed our rope, ate lunch in a spitting acid rain, and began our descent into the volcano.

Now, on the rope below me, Carsten Peter works his way deeper inside the crater. I let more rope slide through my hands, easing myself deeper as well.

With each drop the air shakes more violently; the clouds of poison gas grow thicker.



Waves of pressurized air rumble past me.

Grasping the rope tightly, I halt my descent at the edge of an overhung cliff and stare deeper inside. The lava lake waits below, ejecting orange bombs and smaller drops. Then, in a heartbeat, a wall of thick clouds blows between me and the pit, enveloping

everything around me in a world of gray. In the shuddering air and disorienting noise, gravity, direction, and time seem to fade away. There is only the volcano, its existence a direct result of two tectonic plates colliding below me. Benbow roars again. The earth shakes.

In this moment I know I've gotten close enough to the fire at the center of the Earth. At that same second the clouds part and Benbow reappears. Fumaroles smoke, and steam swirls from the pit's walls. The Technicolor wash swarms around me like a kaleidoscope. Below, Carsten Peter hits the end of the rope just above Benbow's explosive vent. He pulls a camera from his bag and lifts it to his eye.

Torrential rains will frustrate another attempt to explore Benbow. Then dissension breaks out among some of the expedition's porters who helped carry gear up the volcano's steep cone, and it becomes clear that the team will have to leave Ambrym as soon as possible. In a last-ditch, 18-hour marathon, team members drop 1,200 feet into Marum and photograph its lava lake nonstop. They emerge from the crater and find a fractious camp. Jimmy cannot persuade the disgruntled porters to bend, and the tension escalates. With a satchel full of photographs, a few of which are printed here, Carsten Peter finally agrees to abandon the volcano—even as he vows to return.

"I'm cold," camp assistant Ulla Lohmann wrote in her diary. "My bones hurt from sleeping on stones. I don't care. It's too exciting to live inside a volcano." Local porters (below left) were helpful at first, but later some quarreled with the team and frustrated the expedition's plans.



A noise from beneath the earth—**a rumbling *booooom***—fills the pit and rolls across the sculpted ash plain beyond.

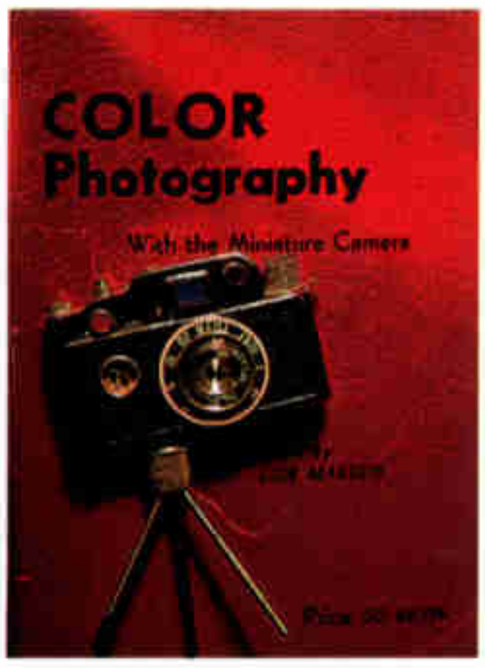
Marum's fireworks dwarf Tessier as he inches along a crust of rock. "You have to be addicted to volcanoes to take a risk like that," says Carsten Peter. He should know. □



THE ART OF BEING

EXPLORER, INNOVATOR, PHOTOGRAPHER, WRITER, GENTLEMAN,

FISHERMAN, DIVER, PILOT, CRAFTSMAN, SAILOR, CONNOISSEUR,



LUIS MARDEN

BOTANIST, LINGUIST, LEXICOGRAPHER, BIBLIOPHILE, RACONTEUR

BY CATHY NEWMAN
NATIONAL GEOGRAPHIC SENIOR WRITER

MEMORABILIA PHOTOGRAPHS BY SARAH LEEN

Self-taught man of encyclopedic learning, Luis Marden enlarged his education in a 64-year career at NATIONAL GEOGRAPHIC. A gifted photographer and writer, he changed this magazine's approach to the world.

PRESENTED
LUIS MARDEN
SENIOR EDITORIAL

NATIONAL
GEOGRAPHIC

HE WILL HATE THAT YOU ARE READING THIS.

He will grumble and denounce the decline of dignity—a virtue too rare in an era of confessional writing, he will say. He will brush aside the praise as if it were a troublesome gnat. He may even, with exquisite politeness, suggest the spotlight pick out someone else.

Such protest will not surprise anyone who knows him. Luis Marden always barricades himself behind a wall of discretion. Yet more than any other figure, Marden personifies the mystique of the NATIONAL GEOGRAPHIC. He is the living embodiment of its ideals and spirit.

By the time he "retired" in 1976 (he continued to write until 1998), Marden had written or photographed—or both—55 articles and contributed to five books. Along the way he found the bones of His Majesty's Armed Vessel *Bounty,* dove with Jacques-Yves Cousteau from the decks of the *Calypso* and pioneered in underwater color photography, retraced Columbus's voyage from Spain to the New World, using as reference the fleet's original log, and discovered a new species of orchid, *Epistephium mardenii,* as well as a species of sea flea, a tiny bottom-dwelling crustacean named *Dolobrotus mardeni* in his honor. He starred as head of the Foreign Editorial Staff, an elite corps of staffers who could photograph a story, write the text, and come back with film for a lecture series, and did more to introduce 35-mm color photography to the NATIONAL GEOGRAPHIC than anyone else.

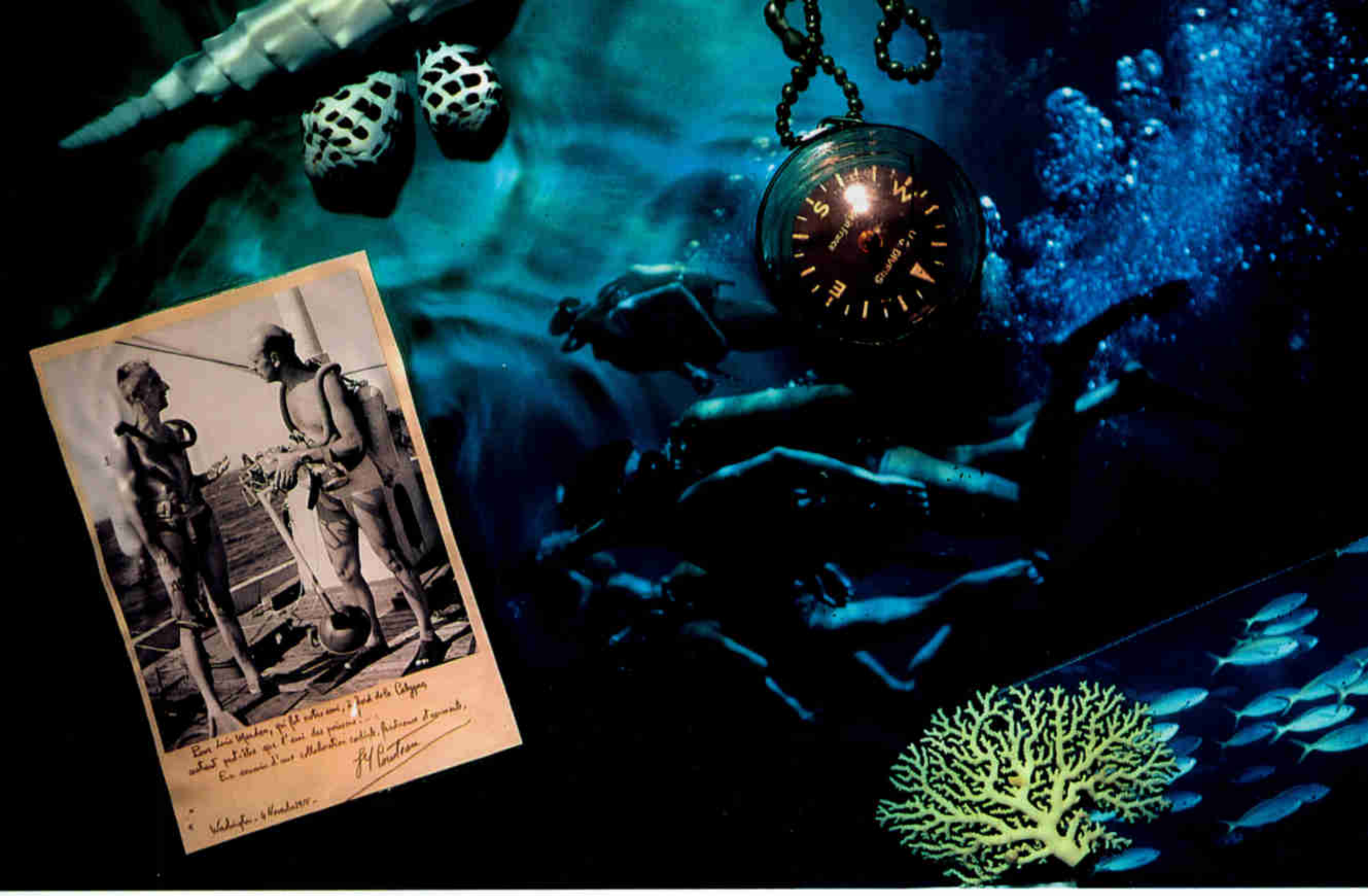
If he sounds larger than life, he is. He combines the refined sensibility of the Old World with a swashbuckling New World sense of adventure. He is a symphony of contradictions. He understands the intricacies of French vintages as thoroughly as those of Fijian etiquette (When offering something to a Fijian, always hold it in both hands, he informed his readers). Although at ease with everyone from princes to street sweepers, he prefers solitude to society. He is a gentle misanthrope at heart. Despite his sophistication in worldly ways, his ideal habitat is a place where, as he likes to say, "the hand of man hasn't put his foot in it."

Notwithstanding his modesty, he is a celebrity to an eclectic circle of admirers on all continents. Long ago, staffers at the magazine stopped being surprised when asked by a Mideast monarch or a mule driver in Mexico: "Tell me, how is Luis Marden these days?" The late Joseph Judge, an editor, claimed a hermit in Alaska turned him down for an interview. He was "saving my story for Luis Marden." A Buddhist monk in Japan questioned by Charles McCarry, another editor, about the bamboo growing in his garden wondered why McCarry didn't save himself a trip by asking his colleague Luis Marden. "In Japan we call Marden-san Doctor Bamboo," the monk told him.

Even in retirement Marden's legend has only increased. At the age of 70 he wrote a story on ultralights, those sparrowlike little aircraft then new on the scene. Naturally he acquired one for himself, named it the *Red Baron,* and began flying it from a meadow near his Virginia home. Of course, Marden had been flying for years; he first soloed in 1935. Back then, he'd take off from a small airfield in a single-engine plane and execute a couple of twists in the air. He'd be wearing a leather helmet, goggles, and a long silk scarf. In the office it was Brooks Brothers pinstripes and a shirt of sea island cotton, although the careful observer might note the silk tie bore a scene from the *Kama Sutra.* He could be risqué but never vulgar. *Todo, pero con manera*—everything, but with civility, he would say, reaching for a phrase in Spanish, one of five languages he speaks fluently.

HIS CAREER at the magazine began with a remark overheard in a Boston elevator. An out-of-town photographer mentioned that NATIONAL GEOGRAPHIC was looking for a photographer, but the job involved extensive travel and the man was married. A friend of Marden's overheard the remark and passed it along. Marden took note; *he* was a photographer and unmarried. He came down in a fabric-covered biplane for an interview and to his surprise was accepted for employment in the photographic laboratory. He was 21 years old, although he had told his interviewer he

"To earthbound man he gave the key to the silent world." So wrote Luis Marden about his friend and colleague Jacques-Yves Cousteau (at left in inset photo), but he might well have been describing himself. In the 1950s Marden was a pioneer—an innovative photographer who knew how to dive when most divers knew little about photography.



"I SEEMED TO HANG SUSPENDED

IN THE HEART OF AN ENORMOUS LIQUID SAPPHIRE."



"Dzibilchaltun: Lost City of the Maya," *January 1959*



"The Exquisite Orchids," *April 1971*

was 24. He thought a 21-year-old might not be taken seriously, even though by then he'd worked in radio for three years and been a free-lance photographer for the *Boston Herald.* He was also author of a small handbook: *Color Photography with the Miniature Camera.*

He reported for work on July 23, 1934. The night before, he had walked over to Society headquarters, an Italian Renaissance brick-and-limestone building on 16th Street, five blocks north of the White House. "I stood and looked at the handsome lighted facade, feeling the excitement and touch of awe that a boy from the provinces might feel on being awarded a scholarship to a great university," he would recall years later, adding: "I can truthfully say I have never really lost that first feeling of eager anticipation and pride about the Society and its work."

He slipped his passions into every story he touched. The pursuit of fish was one. In assignments to follow, he would find a way to cast a line (usually a fly line) into nearly every drop of exotic water he encountered. In Panama he found a trout stream on the slopes of a volcano, caught three rainbows, and photographed them as a still life surrounded, incongruously but beautifully, with orchids. In Madagascar, where the French had thoughtfully stocked trout, he caught several; in Tahiti he went fly-fishing for the perchlike *nato.* "Fishing is a solace," he wrote a friend. "It is, as the writer George Orwell wrote, 'the opposite of war,' a civilized, gentle, and healing occupation."

Variety is not the spice of life to Marden; it is the main course. No wonder, then, that he loves orchids in their 25,000 species, including the Brazilian *Epistephium mardenii* (right, at center), named for its discoverer. Marden's global odyssey began in earnest in 1936 when the 23-year-old staffer surveyed Mexico's Chichén Itzá (inset photo).

THE STORY IS TOLD by Marden how one day in 1936 he and a fellow staff photographer were walking downtown and passed the display window of a camera store. A loop of brilliantly colored 16-mm film was being projected onto a screen. It was the first Kodachrome film. "And I wondered, how the devil did they get that color?" Marden recalled. Inside the store he examined the film with a magnifying glass. Unlike the old, large-format films like Autochrome and Finlay being used then, there were no flecks of color. "The minute any photographer sees that continuous tone," he thought, "he'll know the sky is the limit."

Shortly afterward Marden managed to get hold of a couple of rolls of Kodak's new film in 35-mm format. He lost no time in trying it. He went out and shot some photographs—a goldfish, some postage stamps, his fiancée riding in Rock Creek Park.

He arranged a projection session to show his editors how the new film stacked up against the old. He invited Franklin Fisher, chief of illustrations, and others. He projected the slides. Seeing was believing. The superiority of the new Kodachrome was unmistakable.

The session ended, leaving a vacuum of

ORCHIDS (RIGHT) COURTESY U.S. BOTANIC GARDEN



SCANNING ELECTRON MICROGRAPH BY LEO BARRISH, ALBANY INTERNATIONAL RESEARCH

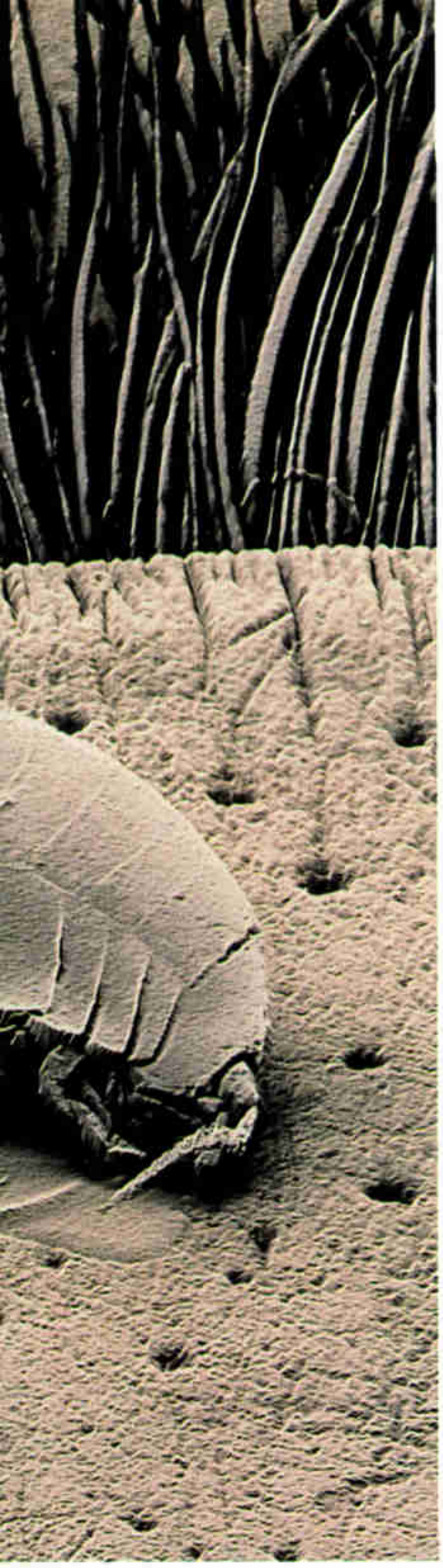
silence in the room. "Thank you, Mr. Marden," said a dispassionate voice. Fisher, a big man and by all accounts dictatorial, was unimpressed. Marden, who saw the potential of the new film and couldn't fathom how anyone could *not* see, was heartbroken.

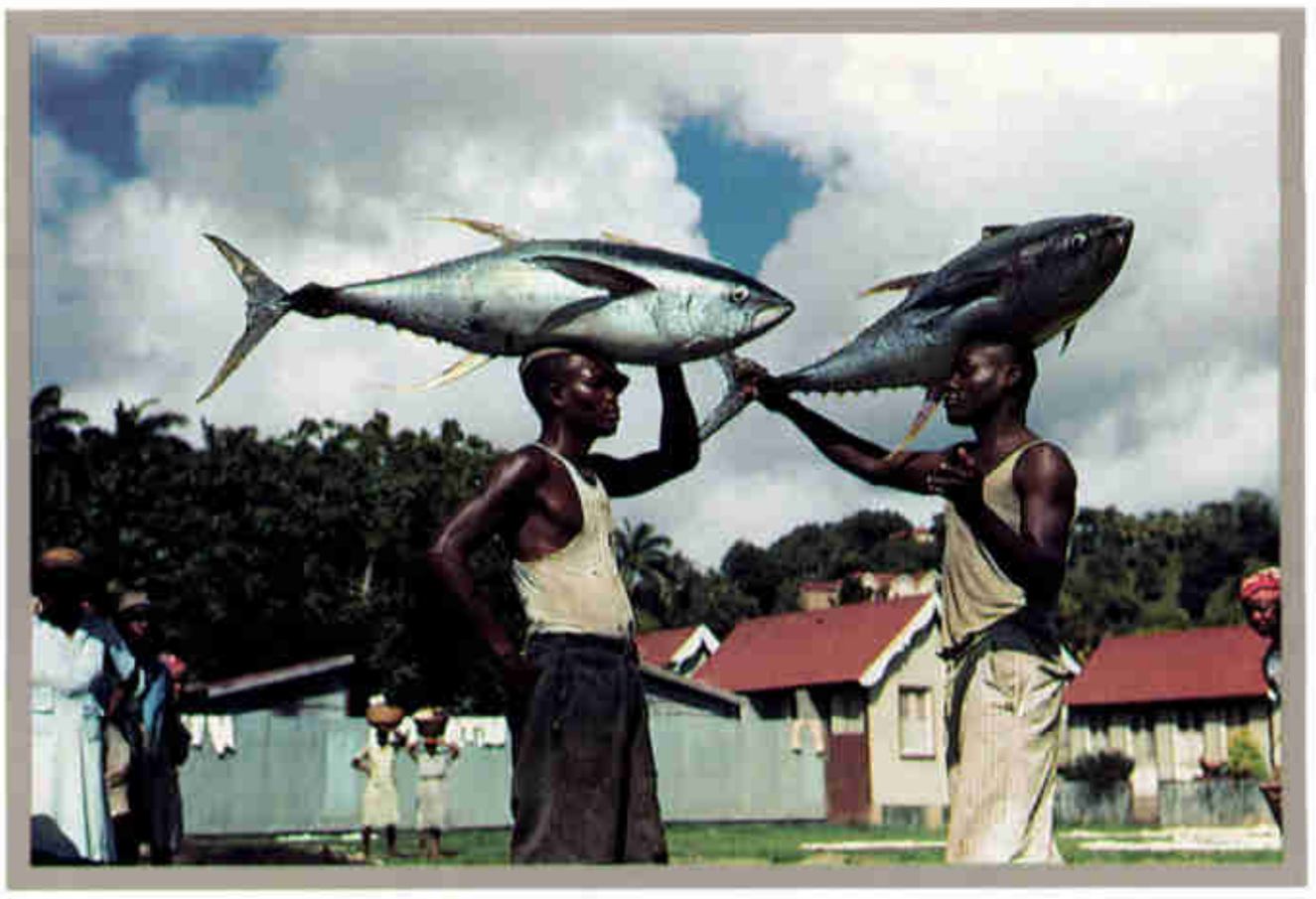
He was soon vindicated. If Fisher didn't understand the superiority of the new film, others did. In 1940, of the 392 color photographs published in the magazine, 350 were Kodachrome. Coupled with the 35-mm camera (which Marden had adopted long before most of his colleagues), the film became the standard for magazine photographers.

When the call came for a story on the American lobster, Marden delivered the goods—and much more. Examining lobster pots on deep-sea trawlers off the New England coast, he discovered a new species of sea flea, which zoologists named *Dolobrotus mardeni* (above, seen through a scanning electron microscope).

"THE GREATEST 'KICK' a field man can have is to carry a million and a quarter members up onto a high mountain, show them the world and say, 'It's yours, in a way it could not be without me,'" Maynard Owen Williams wrote Gilbert Hovey Grosvenor, the magazine's first full-time Editor, in 1929.

There was that—the kick—and there was the magazine's mission *to increase and diffuse geographic knowledge.* The magazine staff lived





"Americans in the Caribbean," *June 1942*

THERE DIDN'T SEEM TO BE A CORNER OF THE UNIVERSE THAT DIDN'T INTEREST HIM. HE NEVER JUST COVERED A STORY, HE LIVED IT.

and breathed to grab a reader by the lapels and propel him or her along that voyage of discovery, providing excitement, inspiration, and knowledge along the way. The horizon was limitless. Enthusiasm was uncontainable. "Do India!!!" Fisher would and did say to a staffer, and off he (it was always a he in those days) would go for weeks, months, sometimes years.

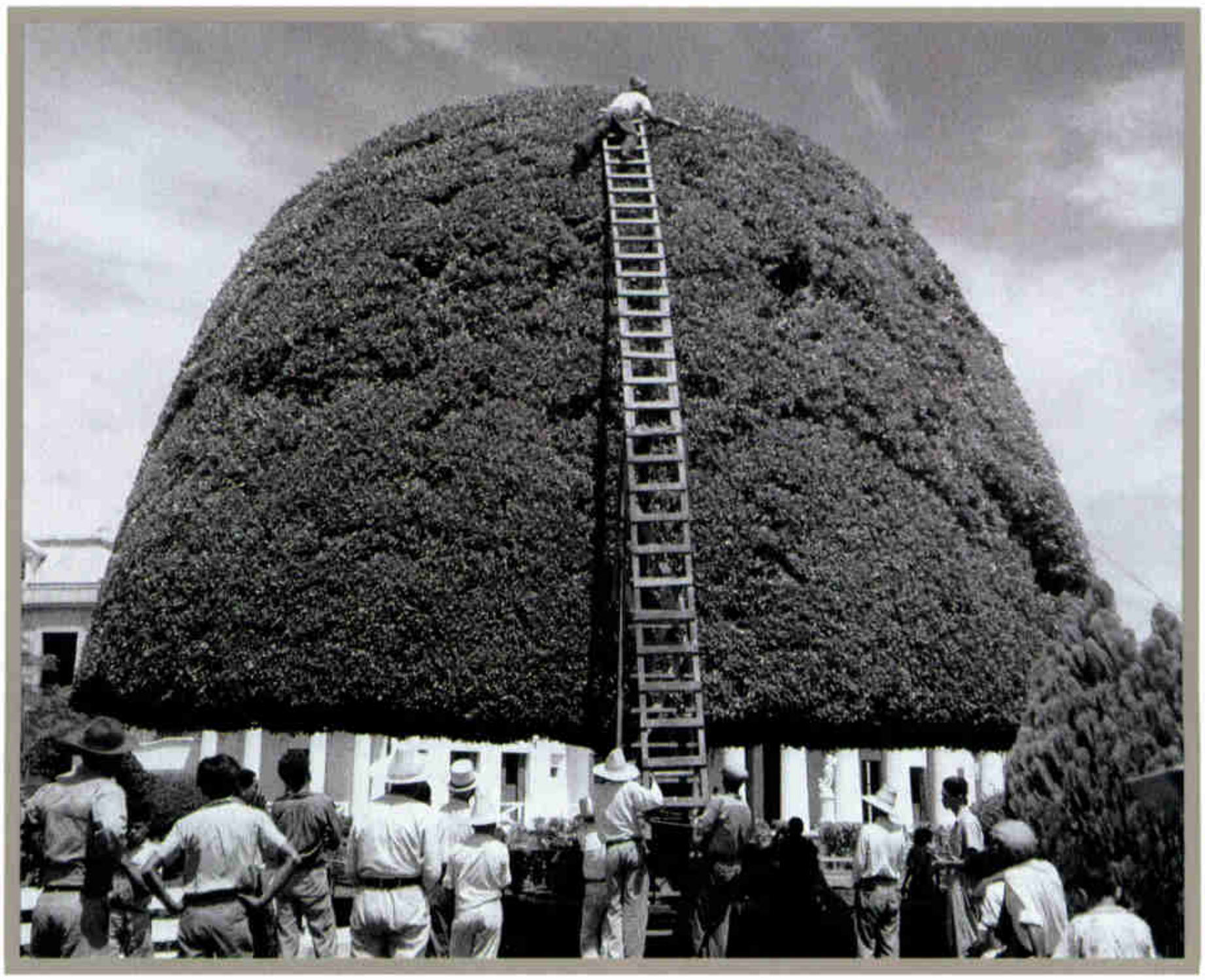
It was a world that fitted Luis Marden as perfectly as a Savile Row suit. No matter that he wasn't the usual college-educated WASP who typically inhabited the wood-paneled offices on 16th Street. Marden, christened Annibale Luigi Paragallo (after Hannibal, the great Carthaginian general), had grown up in an Italian family that had settled in Quincy, Massachusetts, by way of North End Boston. His father, Louis Paragallo, had been an insurance broker; his mother, Celia, a teacher. It had been a family life rich in intellectual nourishment. Had the Depression not stepped in, he would have surely applied to the Massachusetts Institute of Technology, as his mother's family had before him. Instead Marden went to work for a radio station belonging to his uncle, where he broadcast a show on photography. The station manager suggested that Luis Paragallo become Luis Marden; it was easier on the ears, he said. In a time of discrimination against Italian-Americans, it was, perhaps, easier all around.

The lack of a college degree seemed moot. He probably would have been bored by the tedium of formal education. As a teenager he'd mastered a basic reading knowledge of



Loading coal in St. Lucia, 1941 (unpublished photograph)

HE NOT ONLY NOTICED DETAILS, HE COLLECTED THEM. IF CHANCE FAVORS



"A Land of Lakes and Volcanoes" (Nicaragua), *August 1944*



"Riatas and Romance on the Rio Grande," *October 1939*

THE PREPARED MIND, HIS WAS IN A CONSTANT STATE OF RED ALERT.



"Ama, Sea Nymphs of Japan," *July 1971 (unpublished photograph)*



"Tahiti, 'Finest Island in the World,'" *July 1962*

Egyptian hieroglyphics. He wrote poetry. He loved science fiction, particularly H. G. Wells, and in later years formed a friendship with Arthur C. Clarke, author of *2001, A Space Odyssey.* He was what the Germans call *der Autodidakt:* the self-taught man.

There didn't seem to be a corner of the universe that didn't interest him. He never just covered a story, he lived it—rather, he inhabited it—wrapping himself in the subject as if in a cashmere coat. He didn't just write about bamboo, he grew a stand of tonkin bamboo in his yard. In addition to buying the finest bamboo fly rods he could find, he built his own; at last count he had 50 split-cane rods.

His passion was embellished by theatrical flair. When he spoke French, you could almost see him twirling his mustache with Gallic flair. In Spain he assumed the beret, the stance, the gestures of a Spaniard. Once in Italy, Ed Jones, a fellow staffer, ran into him on a bridge. Jones didn't recognize him at first; Marden had returned to his Italian roots.

He was quiet about his accomplishments but not unaware of collegial jealousies. "The tragedy of Marden was that he was not born a British lord," his colleague Kenneth MacLeish once said, with a whiff of envy.

He dressed and acted the part. His manners were impeccable; his bearing, courtly. You would see him in the halls talking with a colleague, slightly stooped, a deferential bend of the head, as if bowing toward the person with whom he was conversing. He loved beautiful things—the perfect varnish of a Payne rod, the burled walnut of a Jaguar dashboard, the graceful lines of a Nakashima chair. He not only noticed details, he collected them, storing each fact in his retrieval bank until the opportune moment when the light clicked on. If chance favors the prepared mind, his was in a constant state of red alert.

The office was wall-to-wall books, stacks of dictionaries and grammars in different languages—Tahitian, Fijian, Latin, Spanish, French, Italian, Danish, Arabic, Tongan, Turkish, Maori; books on celestial navigation, sailboats, fish, birds, orchids; autographed photographs from the King of Tonga, Cousteau, Orville Wright; and, on a corner table, an old brass diving helmet from the Mediterranean. In later years his door bore two inscribed plaques: Lat 38° 54′ 17″ N and Lon 77° 02′ 18″ W, representing the coordinates of his office. He was a man, you might say, who knew precisely where he stood.

If Luis Marden seems like a character straight out of fiction (as colleagues often claim), then the South Pacific has been one of the story's recurring themes. Multiple assignments took him to the Pacific isles, including Tonga for the 1967 coronation of King Taufa'ahau Tupou IV (Marden in gray top hat, with then Editor Melville Bell Grosvenor).

IN THE 1930s and on into the '50s, a foreign assignment for the magazine commenced with an ocean crossing on a luxury liner. Marden would pack black tie and


TONGA 5/-
TOFUA
MUTINY OF THE BOUNTY
A.D.
ontmar
17.00
OF THE ISLAND
OTAHEITE,
BY
LIEUT. J. COOK
1769.
MARINER in the COSTUME, of the

cameras and, armed with letters of credit and an expense account book with the entry "Gifts to Natives," set off for distant shores under the flag of one of the grand steamship companies: Cunard, Moore-McCormack, the Italian Line. Years later, when the pace of the world and the magazine picked up, he was forced to travel by air. "I was so pressed for time (the prevailing sickness of our age) that I had to fly," he wrote mournfully to a friend.

For his first foreign assignment, in Mexico, he went from New York by way of a New York & Cuba Mail steamer; he disembarked at a Yucatán port and went to work, trekking overland by open Model T Ford touring car and mule. In those early days of slow lenses and



slower film, "hold still" was the first thing you learned in any language. In Maya, Marden recalled years later, "hold still" was *ma' pek.*

ONE DAY IN 1939 he asked for a day off, and when his boss, Edwin Wisherd, the taciturn head of the photographic laboratory, gruffly asked why, Marden replied he wanted to get married. He took Friday off and was back to work on Monday.

The mutiny aboard the *Bounty* (replica, right) inspired Marden to embark on his own adventure: to find the remains. In 1957, off Pitcairn Island, he did. He had the ship's nails made into a necklace (above, on an oyster shell) for his wife, Ethel. They named their home after the brook trout, *Salvelinus fontinalis*—to Luis, "the most beautiful fish that swims."

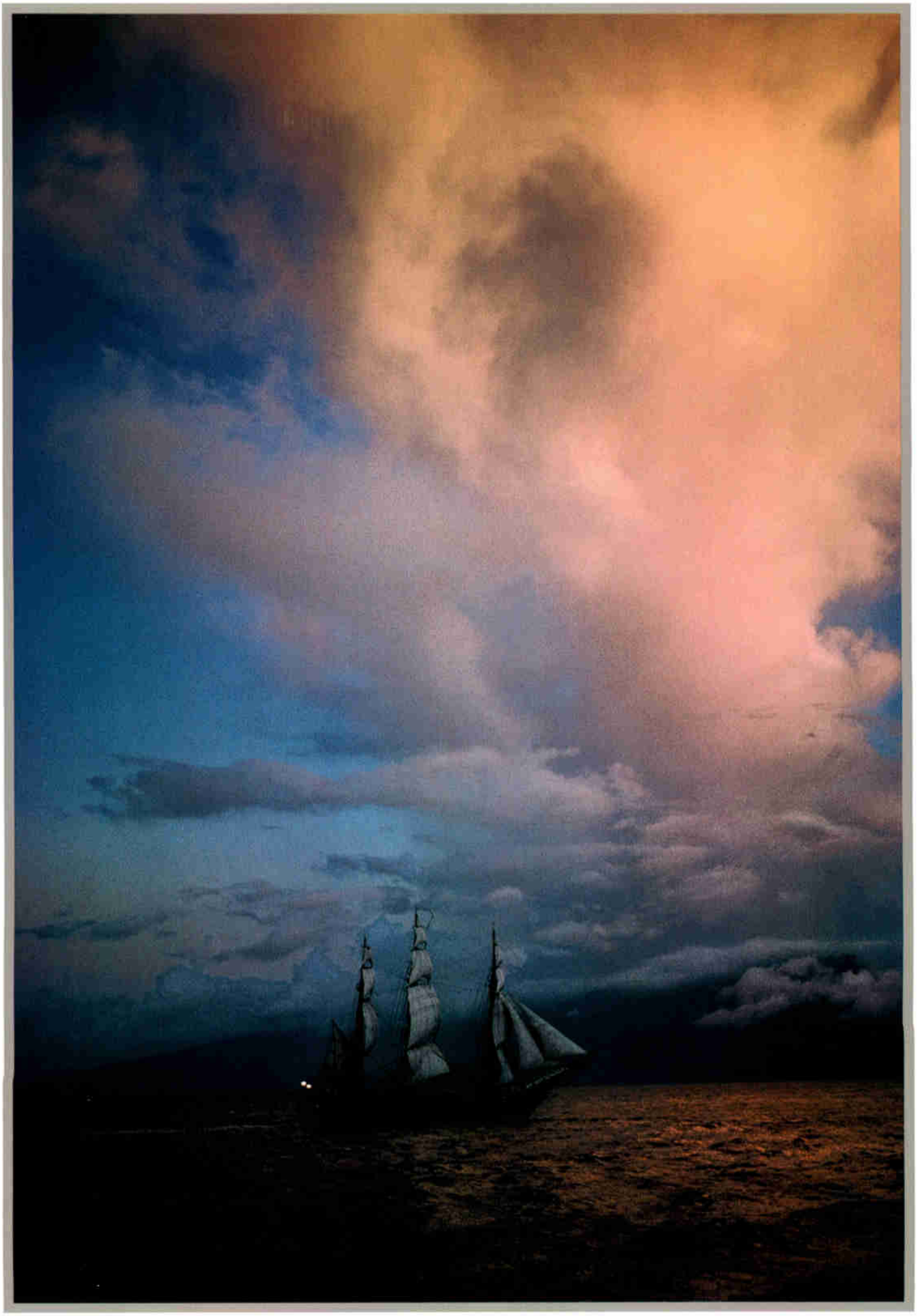
He married Ethel Cox, a mathematician with the National Bureau of Standards. She was a small, tough, dark-haired woman with dancing hazel eyes who grew up on a West Texas ranch. Her no-nonsense practicality was the perfect foil for his dreamy imagination. They met at a boarding house where both rented rooms. "I've always loved dormer windows," he once told a friend. He explained that during their courtship he rigged up a telegraph line running from his dormer window to hers. Then he tapped out: *I love you.*

It was a good fit, one that survived the inevitable frictions of marriage and the long absences of the job. As the only son and eldest child of an Italian mother, Marden grew up with a self-confidence born of the certainty that he was adored and special. Ethel took up where his mother left off. He was her center of attention. She was his center of gravity. She was the practical one who tethered Luis, the dreamer, to reality. Ethel made sure the roof got fixed, the car serviced, and the bills paid. His intellect danced from thought to thought. "I have a grasshopper mind," he always said.

THE WIT was instantaneous. When an acquaintance mentioned that the wines resting in the cellar of '21,' the famous New York restaurant, had been damaged by the vibration of the subway going through, he riposted: "That's the trouble with subways. They have no respect for the vintage."

Marden *had* respect for the vintage—for the fine patina of wisdom and tradition that age and experience impart. He loved the new as well. Whatever it was, camera or computer, he had to have the newest, fastest, smallest. But if technology was on the rise, everything else, in his estimation, seemed to be going straight downhill: syntax, integrity, dignity, and, most of all, manners. The world's rude jolt forward was not always to his taste. "You know," he once said to a younger colleague, "young fellows these days are so ambitious. It's like Diana [the mythological huntress] with her arrows. Really, there are enough hits for everyone."

His ambition had nothing to do with corporate advancement; it was simply to wring out



"Huzza for Otaheite!" *April 1962*

every last experience and piece of knowledge the world had to offer. "Luis was never after power, he was after independence," his friend and colleague Bates Littlehales observed. He coveted free rein to pursue his interests, whether bamboo or smallmouth bass. If talk in the halls turned to some political machination afoot in the office, he waved it off with an air of indifference. The trappings of higher position never tempted him. "That's why I'll always be a corporal," he would say.

Language, nuanced and precise, was sacred to him. To place a word gracefully in front of the reader was as important as the proper presentation of a fly to a discriminating trout. Almost the right word was unacceptable. Only the right word would do.

To Bob Moore, then chief of the Foreign Editorial Staff, he wrote in 1961:

I note in your little biography that you were "raised" in such and such a place; corn is raised; people are reared.

To Margaret Bledsoe, the imposing head of research, the department charged with ensuring the accuracy of every word in the magazine, he sent this reproof:

Sept. 2, 1965

Hello, Margaret:

What happened to the English majors in your department? While leafing through the issues of the past few months, I note the phrase "opening gambit"; obviously, this is redundant, since a gambit means an opening move. If we keep talking this television English, the next step will be "temper tantrum."

He took on the editors of Webster's dictionaries, pointing out the misspelling of Iztaccíhuatl, a dormant volcano near Mexico City, which he had flown over and photographed in 1937. In years to follow, Marden sent up a string of lexicographic flares. In deference (or perhaps defense) Webster's would, in the unabridged third edition, cite Marden as an authority for no less than six entries—including snick (a clicking noise), tot (a shot of alcohol), and sevillana (a Spanish dance).

EVEN IN AN ERA of "take as long as you like as long as you come back with the story," Marden could stretch the limits. In November 1960 he sailed to Tahiti for a story on that "golden dream of everyman." The stay stretched over into 1961. It was February, March, then April. He sent word to headquarters. It had rained incessantly, he told his editors. He had been sick; he had been flat on his back in bed; the moisture had ruined his film. It was all true and part of the torturous process of doing a comprehensive coverage worthy of NATIONAL GEOGRAPHIC. Editors began to fret. Gentle inquiries asking the date of his return were sent, then not-so-gentle inquiries, and then a series of telegrams of escalating pitch. Finally, the Editor sent this:

Want you back soonest. Have confirmed seat for you today June 14, TAI to L.A.

—Grosvenor

"Luis would just go to ground," an editor would say years later. "We couldn't find him. Then he'd finally come home and pull out an egg or something and redeem himself. We're going to put on his tombstone: 'This time Luis really has gone too far.'"

He pushed hard, then harder, exasperating editors. Then he would redeem himself every time. Sent off to Madagascar, "Island at the End of the Earth" (October 1967), he came back with the story and two eggs of the extinct *Aepyornis*, a ten-foot-tall, feathered remnant of evolutionary history. After acquiring the fossils (aided by liberal doses of bribes and rum), he had wired headquarters: WE HAVE FOUND THE AEPYORNIS NEST.

MARDEN HAS ALWAYS LOVED the ocean. Wollaston Beach was within walking distance of his childhood home. As a boy he would walk to the shore, collect sea creatures, observe them, and then return them. When the French Navy officer Cousteau co-invented the Aqua-Lung, the key to the underwater realm, Marden bought one right away. In 1955 he was sent to dive with Cousteau on the *Calypso* to take still pictures. As the only American and an outsider, there was resistance at first ("Because divers breathe compressed air, they all have inflated egos," he said), but his

Fish in hand, camera slung around his neck—was Marden working or on vacation? The distinction was often lost on Luis, for whom an interest in bamboo, for instance, would grow into a magazine story on the plant and a bamboo garden of his own. His collection of bamboo fly-fishing rods grew to number 50, including some he crafted himself.



HE COVETED FREE REIN TO PURSUE HIS INTERESTS, WHETHER BAMBOO OR SMALLMOUTH BASS.



"Shad in the Shadow of Skyscrapers," *March 1947 (unpublished photograph)*

hard work and talent finally won Cousteau's respect and admiration.

If the experience of diving with Cousteau was exhilarating, it could be equally frustrating. Underwater photography was in its infancy, and equipment was crude. Marden used a camera locked in a watertight box and used up more than a thousand flashbulbs, which often imploded under the pressure, twice gashing his hands. One implosion at a hundred feet, he wrote, "drove the glass through my heavy leather glove with the impetus of a shot from a gun." His diving partner pulled out the shard. To protect his hands on future dives, he bought a pair of chain mail gloves of the kind used by butchers.

His story "Camera Under the Sea," which ran in February 1956, was the first full-length underwater feature illustrated in color, and in his words and photographs you can feel his love of that blue world. "The luminous transparency of the warm water bathed me in light. Fish, corals, even my own body, were outlined with a soft lunar effulgence; I seemed to hang suspended in the heart of an enormous liquid sapphire," he wrote.

"LUIS ALWAYS MIXED his fantasies with reality," commented Bates Littlehales. "He would just hunt those fantasies down and make them fit the situation. In another era he could not have done it. It takes a tremendous amount of trust and support from your editors."

Soñar no cuesta nada, dreaming costs nothing, he might say. One of his longest held dreams was of finding the remains of the *Bounty.* He thought Bligh's trip across 3,618 nautical miles of Pacific in an open boat without losing a single man the greatest feat of navigation ever. He'd seen the rudder in a Fiji museum in 1954 and learned it had been dug out of waters off Pitcairn Island. He was sure there was more of the *Bounty* to be found.

To see and savor the Earth—and to take generations of readers along for the ride—were the gifts of Marden's inquisitive mind and prodigious talent. Readers relished those journeys, and editors had enough sense to give slack rein to the lead rider. Luis Marden was the quintessential NATIONAL GEOGRAPHIC journalist.

For two years he badgered the editors to let him go to Pitcairn and search, and finally in 1956 Melville Bell Grosvenor, who understood enthusiasm when he saw it and who knew how to say "yes," sent him off.

Day after day he dove near the spot where the rudder had been found. "For six weeks we nearly plowed furrows in the bottom with our chins, but found nothing," he recalled. Finally, late one afternoon near the end of his stay, he was diving with Len Christian, one of mutineer Fletcher Christian's descendants, and swam over a sandy trench with wormlike squiggles. In "I Found the Bones of the *Bounty*" (a title the self-effacing Marden would never dream of writing), he describes the moment of discovery:

"I thrust my face closer, almost touching the bottom. My heart gave a jump. The squiggles were encrusted sheathing nails, *Bounty* nails—dozens of them. I looked up for Len. He was just above me, staring questioningly. I reached up my hand for his, pumped it violently, and pointed. He looked up grinning and nodding, and we shook hands again. We had found the resting place of the *Bounty.*"

THE LINE BETWEEN Luis Marden's life and the NATIONAL GEOGRAPHIC blurred early; the two soon became a seamless whole. Love is not too strong a word to describe how he feels about the magazine that engaged his head and heart for half a century. "The GEOGRAPHIC has been my father and mother, my residence, my castle," he told an interviewer.

We may chart our life. We may sail for distant ports, finding fresh wonder in the far reaches of the world. Eventually, the rudder slips from our hand. Time weakens us. Fate overtakes us. We drift, becalmed. These days Luis Marden lives in a nursing home.

"I've had the best of it," he recently told a close friend. "It's time to zip up and shut the rest of the world out." And he had tasted the best of it, through sheer force of will, an intellect of extraordinary breadth and depth, and an imagination that soared.

"One lifetime isn't enough," Marden once said. "Just when you start to learn, it's time to go." □

MORE ON OUR WEBSITE

To see additional photographs by Luis Marden and a complete listing of his articles go to **nationalgeographic.com/ngm/0011.**



"Coffee Is King in El Salvador," *November 1944 (unpublished photograph)*

Preying on giants

On guard but holding his position, a lion endures proximity to an elephant that neither would normally tolerate. But it's the dry season, and this is the only water around.

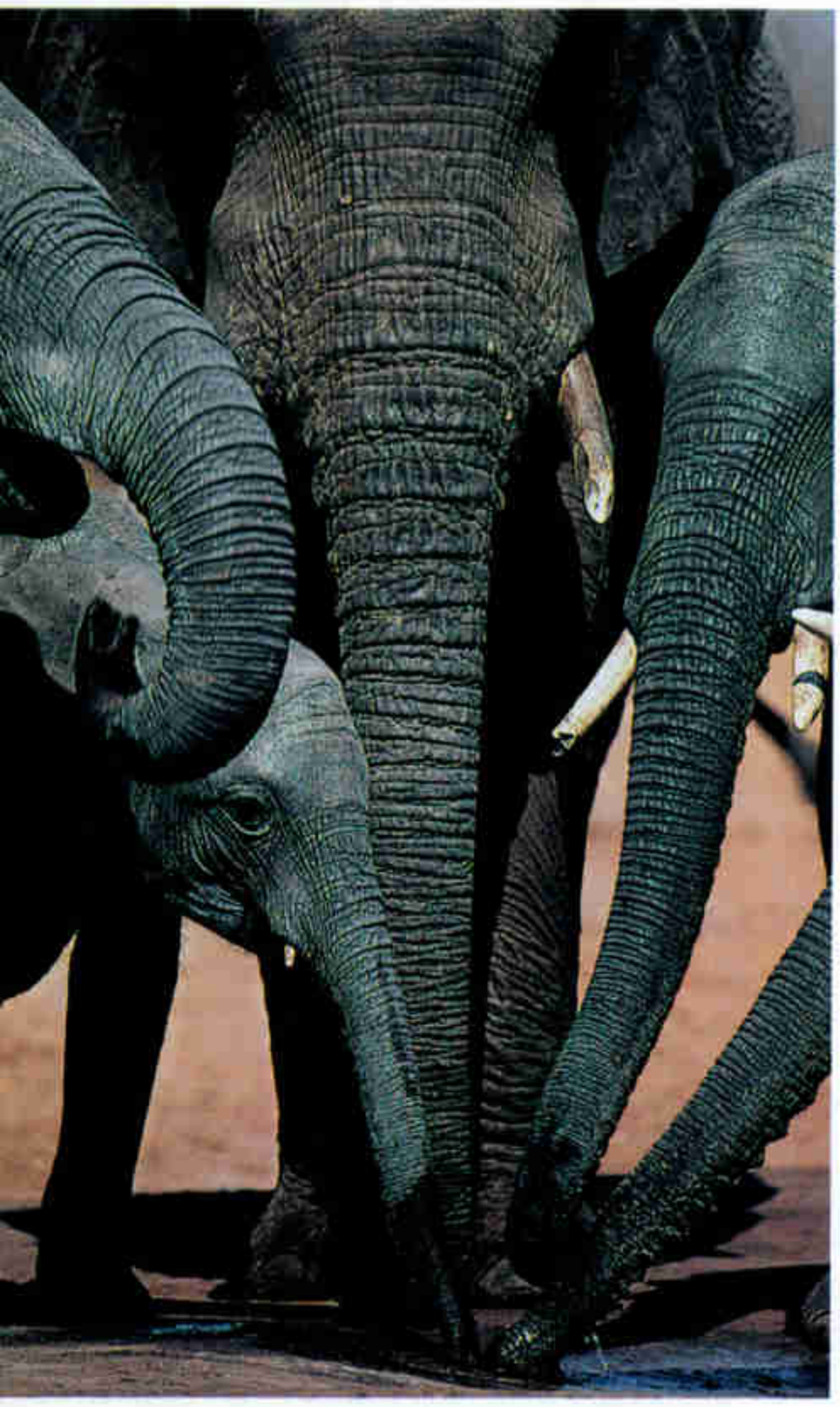
What happens when lions and elephants are forced to share a shrinking water hole in Botswana's Chobe National Park? Lions get a taste for pachyderm.

By Dereck Joubert • Photographs by Beverly Joubert



Lions are opportunists. They're not too proud to eat insects or porcupines or too timid to hunt things much larger, like buffalo or hippos. But we were shocked to discover a pride in northern Botswana that regularly hunts Earth's largest land animals: elephants.

We first started observing lions in Chobe National Park in the early 1980s. A couple of times in those early years we saw lions attack elephant calves that had become separated from their herds. But what we discovered in the mid-1990s at one particular water hole was quite different—not just opportunistic attacks on young stragglers but deliberate hunting within elephant herds.



Lions and elephants generally keep their distance from each other. But in the dry season, roughly April through October, water becomes more vital than caution, and a water hole can bring even wary adversaries into close quarters. The elephants at this water hole (left)—by October only four inches deep and the diameter of a dining room table—squeeze other animals out, and the lions respond accordingly, eventually coming to rely on elephants for more than half their food. The first kill we saw was a six-year-old calf. With each kill the lions got bolder, attacking older calves, engaging in frontal attacks within the herd, chasing off six-ton females to get to their young. Finally, they even started attacking adults—a shocking sight never before photographed.

MORE ON OUR WEBSITE

Experience the wonder of an elephant birth in exclusive photos at **nationalgeographic.com/ngm/0011.**

Trying to scare off a surly lion, a bull elephant kicks dirt and flares his ears to show he means business. The lion stands his ground, retreating only when his adversary is almost on top of him.

They'd rather not mix, but in the dry

In early morning, doves throng the water hole, which elephants have virtually emptied overnight. The hundred or so bulls that control this spring-fed hole can each drink 50 gallons a day. Other animals—including resident lions and roving herds of female and young elephants—must take what they can.

season water is more vital than caution.

As evening falls, two rivals calmly coexist by the early season pool. Frenzy sets in as herds of elephants and calves arrive and jockey for position (right). With rare boldness lions attack a healthy young adult that has become separated from her herd (bottom left), but they fail to make the kill. A fallen bull (bottom right and following pages) is quickly attacked.

With night comes a frenzy of drinking

and feeding, fighting and dying.

As they become familiar with elephants,

Felled by age or illness, a bull elephant becomes a week's worth of meat for the pride. Chobe's elephant population, protected from hunting by humans, has exploded as lions have become the animal's only predators.

the lions come to prefer them as prey.





In a ritual that's still undecoded, a bull sniffs the remains of a six-year-old calf killed by lions the night before. Most elephants that age, having beaten the odds of infancy, survive to adulthood. But most elephants don't have lions tracking their every move. When October's rains finally come and the animals go their separate ways, elephants will get a reprieve from the big cats—for a season. □



It's hard to say who's more interested in the dead—those that mourn or those that eat.

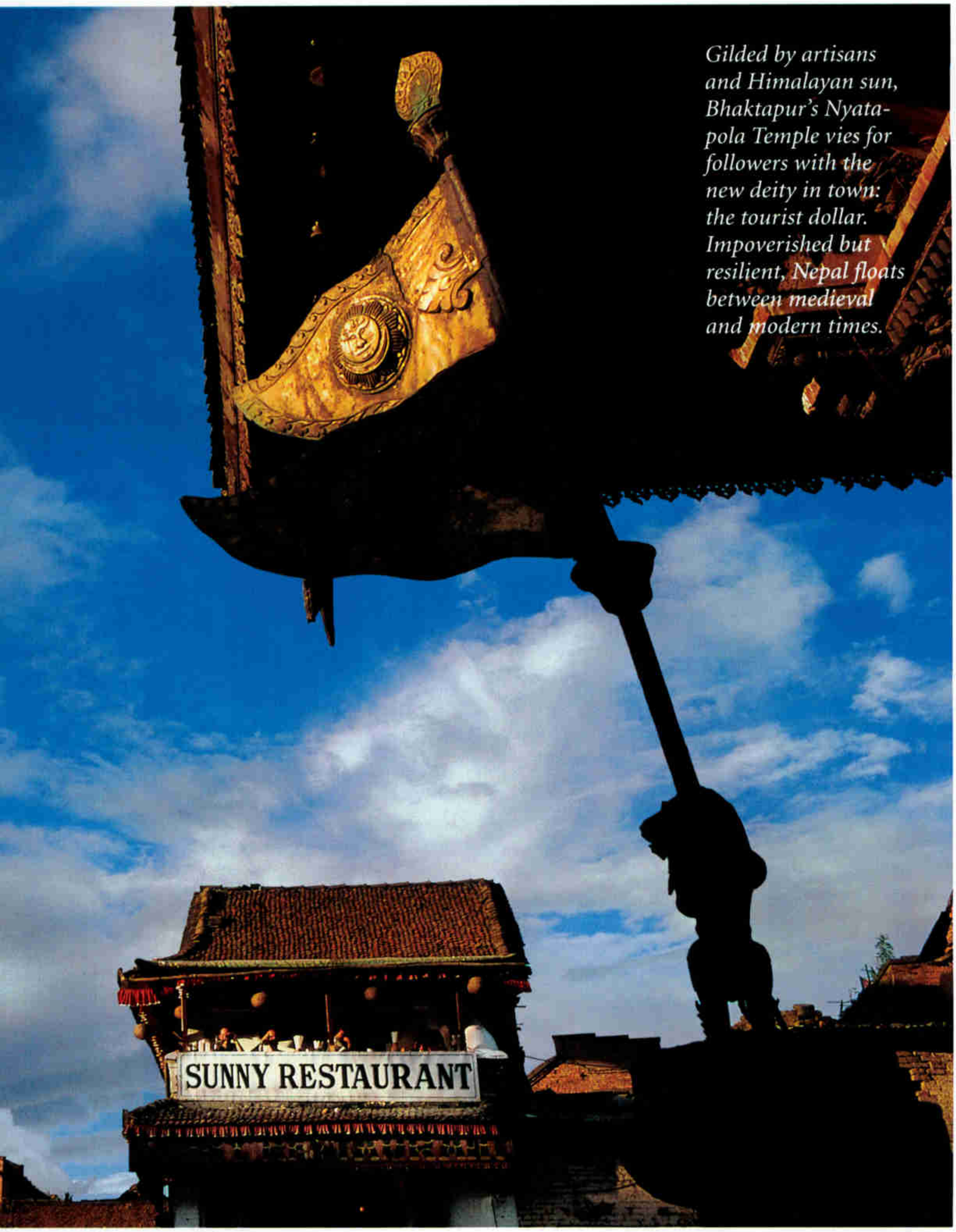
N E



CHANGED FOR GOOD,

P A L

Gilded by artisans and Himalayan sun, Bhaktapur's Nyata-pola Temple vies for followers with the new deity in town: the tourist dollar. Impoverished but resilient, Nepal floats between medieval and modern times.



FOR B A D, FOREVER

By T. D. ALLMAN ♠ *Photographs by* MAGGIE STEBER

BISHNU PRATAP SHAH still remembers the time he wanted to punish the servant for losing the snowball. "I was nine," Bishnu said. "It was my first snowball. I told him to keep it for me, but when I came back, the foolish fellow claimed it had disappeared."

This incident happened in 1944, but in Nepal it might have been 500 years ago. Nepal was still Asia's forbidden kingdom—ruled by hereditary prime ministers, the Ranas. Polygamy and child marriage were legal. Technologically, too, Nepal was in the Middle Ages—no airplanes, no roads. Bishnu had reason to want to keep his snowball. The eternal snows of the Himalaya glisten on the far horizon above Kathmandu all year round, but it snows in the city, on average, only once in a Nepalese lifetime. It's a sight to remember: the snow shimmering on the multitiered pagodas, dusting the bare bodies of the erotic sculptures. Ringing temple bells and the Sanskrit chanting of Hindu priests echo down the alleys of a medieval city that—just this once, until the snow melts—might be located beside the Rhine, in the Pied Piper's time, not in the lap of the Himalaya.



Bishnu was raised by relatives and retainers, including the man caring for him that memorable day. "I wanted to take my snowball home; when he said it had disappeared, I accused him of hiding it. He was very confused. He told me it was nowhere to be found."

Bishnu explained: "Back then Nepalese didn't understand snow melted, any more than we understood the world is round."

More than 40 years later many Nepalese still didn't know. In 1987 Bishnu and I trekked into his home village, Maidi, in the mountains west of Kathmandu. I was the first American to step foot in Maidi. People in the tea shop there had heard something very peculiar—while the sun was shining in Nepal, it was nighttime in America. They wanted to know why.

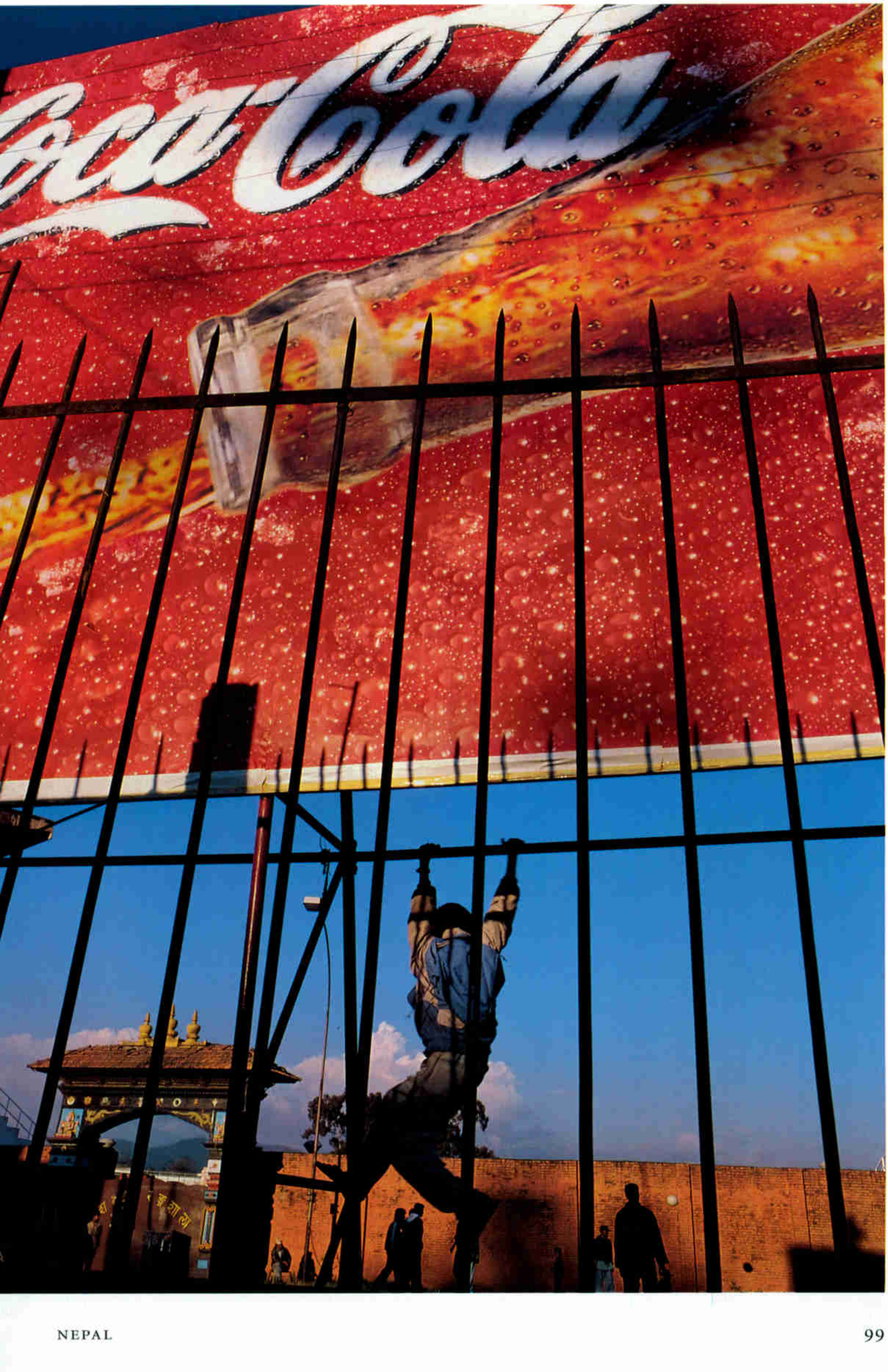
I called for an orange and a Petromax lantern. The tea shop owner pumped up the pressure lamp so it glowed. "This lantern is the sun," I said. I held up the orange. "And this is the Earth. It is not flat; it is round, and it turns." I made a mark on one side of the orange, then another on the other side. "This is Nepal. And this is America." Then I turned the orange. As they watched Nepal and America rotate between light and darkness, I saw the light of comprehension in their eyes, especially in the children's eyes.

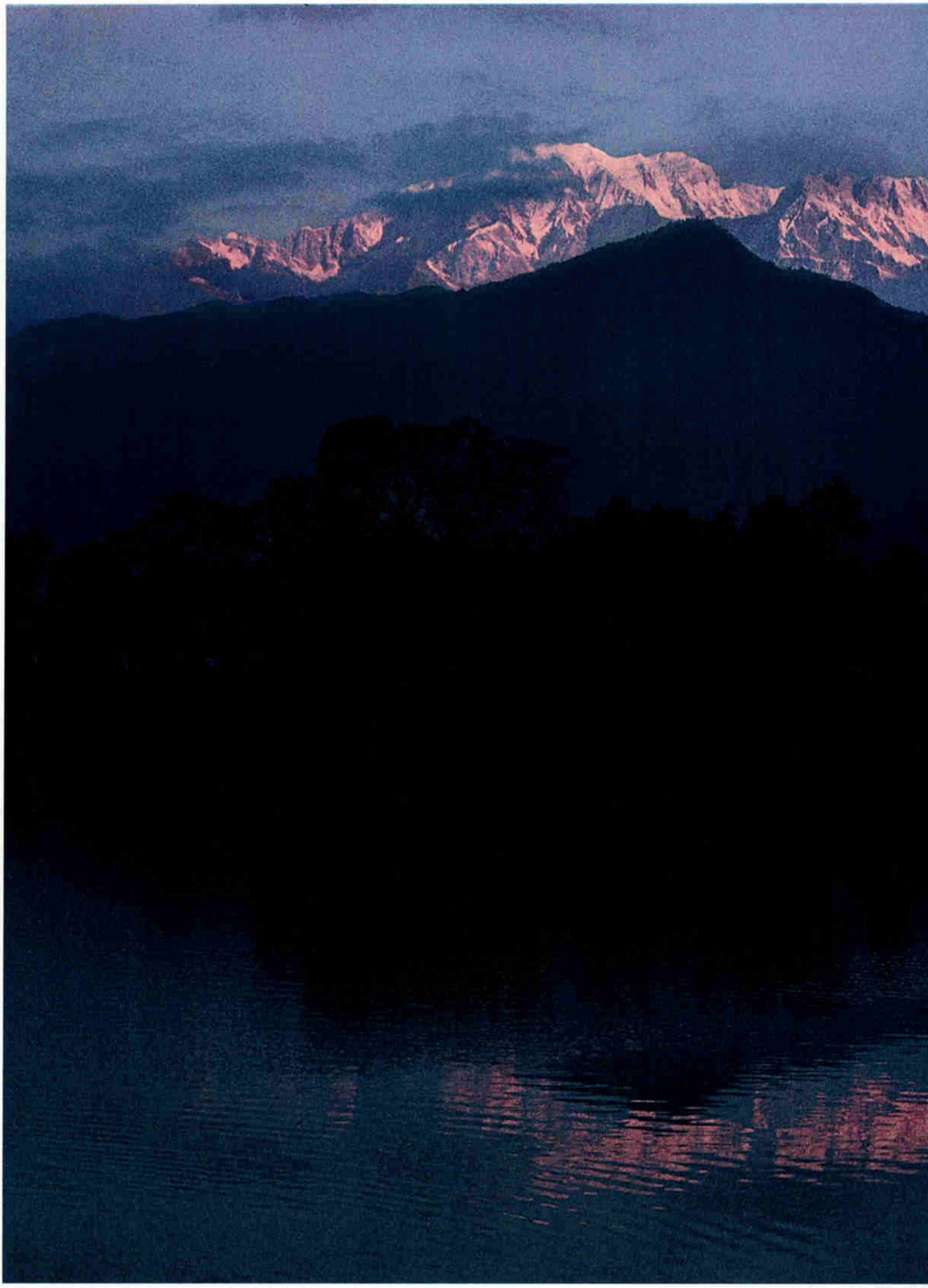
Icons of East and West converge in the Kathmandu Valley. An image of the late Buddhist scholar Dilgo Khyentse Rinpoche (above) comforts an elderly Tibetan refugee. Schoolboys thirst for Western fare (opposite) outside the national stadium.

On my latest visit to Nepal, I saw a new kind of light in the eyes of some Nepalese children. At a cybercafé named K@mandu, they peered into flickering computer screens—an experience, judging from their excitement, they would remember as long as Bishnu remembers his snowball.

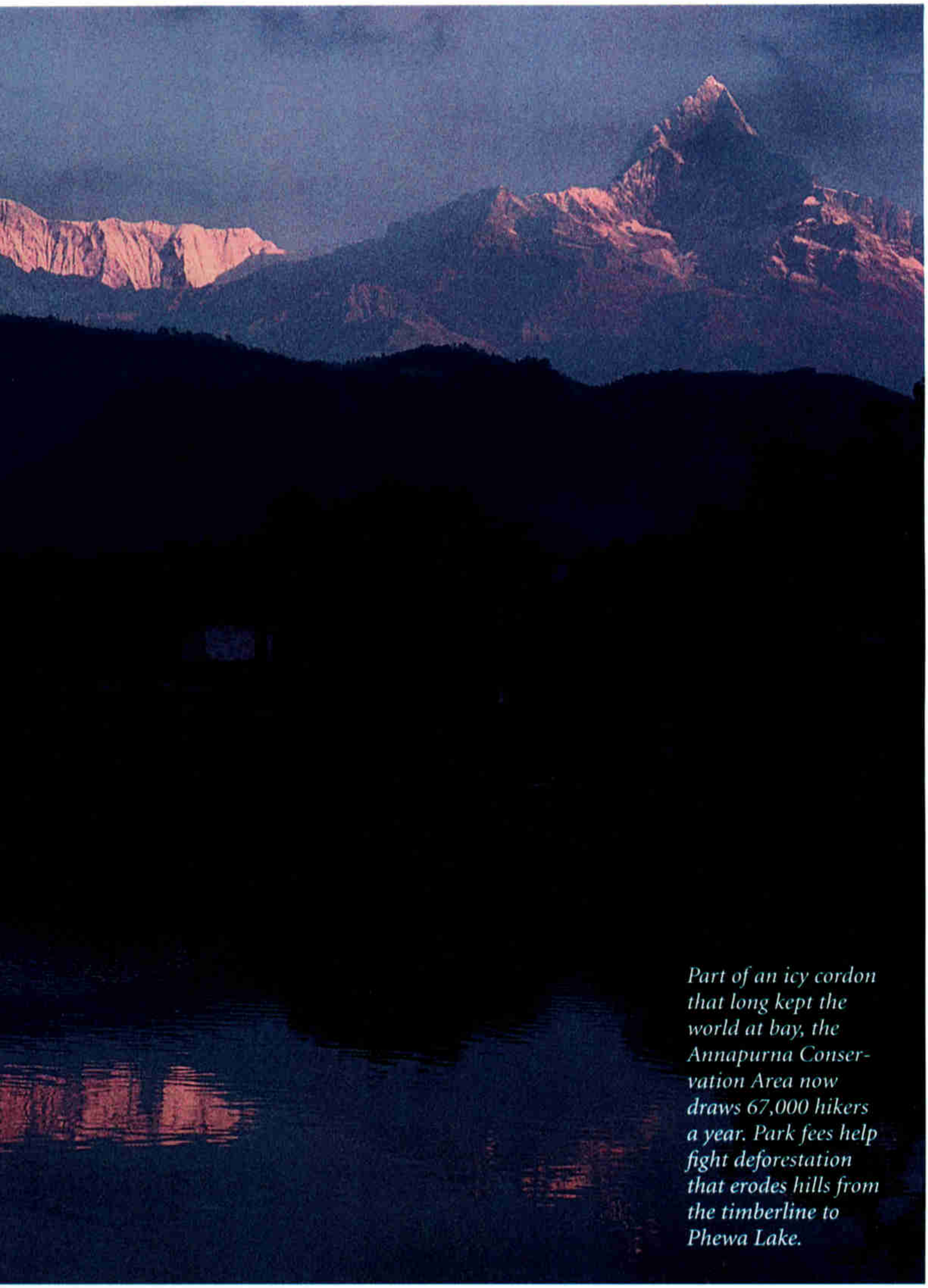
As Bishnu and I reminisced, he put the changes in personal terms: "No Nepalese has lived or ever again will live a life like mine. My parents were born in the Middle Ages. My son belongs to the 21st century. Only my life spans both the Middle Ages and the new millennium.

"No Nepalese ever again will live in three epochs," Bishnu repeated.





ALOFT, THE HIMALAYA EMBRACE US IN



Part of an icy cordon that long kept the world at bay, the Annapurna Conservation Area now draws 67,000 hikers a year. Park fees help fight deforestation that erodes hills from the timberline to Phewa Lake.

SERENITY. BELOW, POLLUTION BILLOWS.

FIFTY YEARS AGO NEPAL WAS STILL ASIA'S FORBIDDEN KINGDOM. POLYGAMY AND CHILD MARRIAGE WERE LEGAL.

"Someday you must tell the story of how Nepal went from the Middle Ages to the 21st century in one lifetime."

THREE YEARS after I trekked to Maidi, in 1990, Nepal took a political leap out of the Middle Ages. A people power revolution broke out there following uprisings in countries from the Philippines to Romania. Though the outside world has scarcely noticed, for a decade since this spring awakening Nepal has been a laboratory of democracy. Nepal's voters can and do throw out governments that displease them in hotly contested, free elections. But corruption has not been eradicated. High-caste and well-connected Nepalese remain far richer and better educated than the population as a whole. A small but persistent Maoist insurgency has emerged in a few remote hill districts, fueled by poverty and Nepal's chronic failure to do anything about it.

Nepal is one of the few countries left where men still outlive women. Traveling around the country, you understand why. In Kathmandu whole families perch on motorbikes. Father and son wear crash helmets; mother and daughter inevitably do not. A two-day walk from Kathmandu, a man wearing Western trousers and shirt strides uphill, cupping a transistor radio to his ear. His wife and daughter follow, carrying heavy loads like pack animals. He wears shoes; they are barefoot.

Nepal, in spite of its Shangri-la image, is poorer than Bangladesh; the average income is $210 a year. And with nearly 25 million people Nepal isn't tiny except in comparison with its gargantuan neighbors, China and India.

In such a situation, can ways be found to empower people? Are machines more useful than magic? Is it better to believe the king is a god—or to believe that by putting a paper in a ballot box you master events?

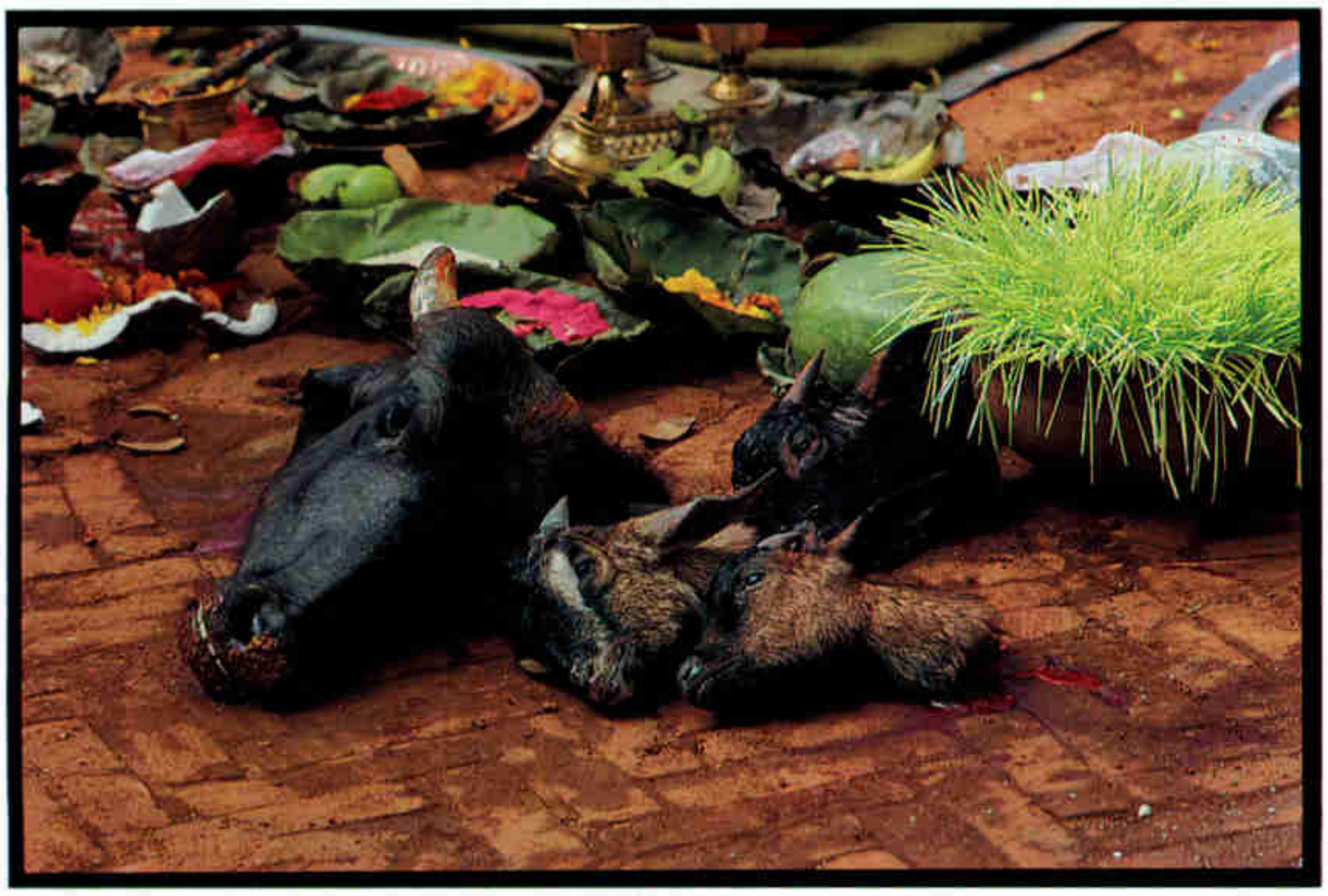
In the Nepal I got to know as a Peace Corps volunteer in the 1960s, such questions were practically meaningless. The country I traversed by foot, and occasionally on horse or elephant, was not much different from the world of King Prithvi Narayan Shah, the Gurkha warlord who in 1769 created Nepal by conquering the Kathmandu Valley, adding it to his mountain domains. In villages I visited, the flintlock musket was high technology; people believed the goddess Kali caused smallpox.

Already, however, new voices spoke from magic boxes—transistor radios. New "stars" streaked the sky. Villagers tracking the new Earth satellites with their keen eyes called them *gumnewalli*—wanderers—just as ancient Greeks had used their word for wanderers,





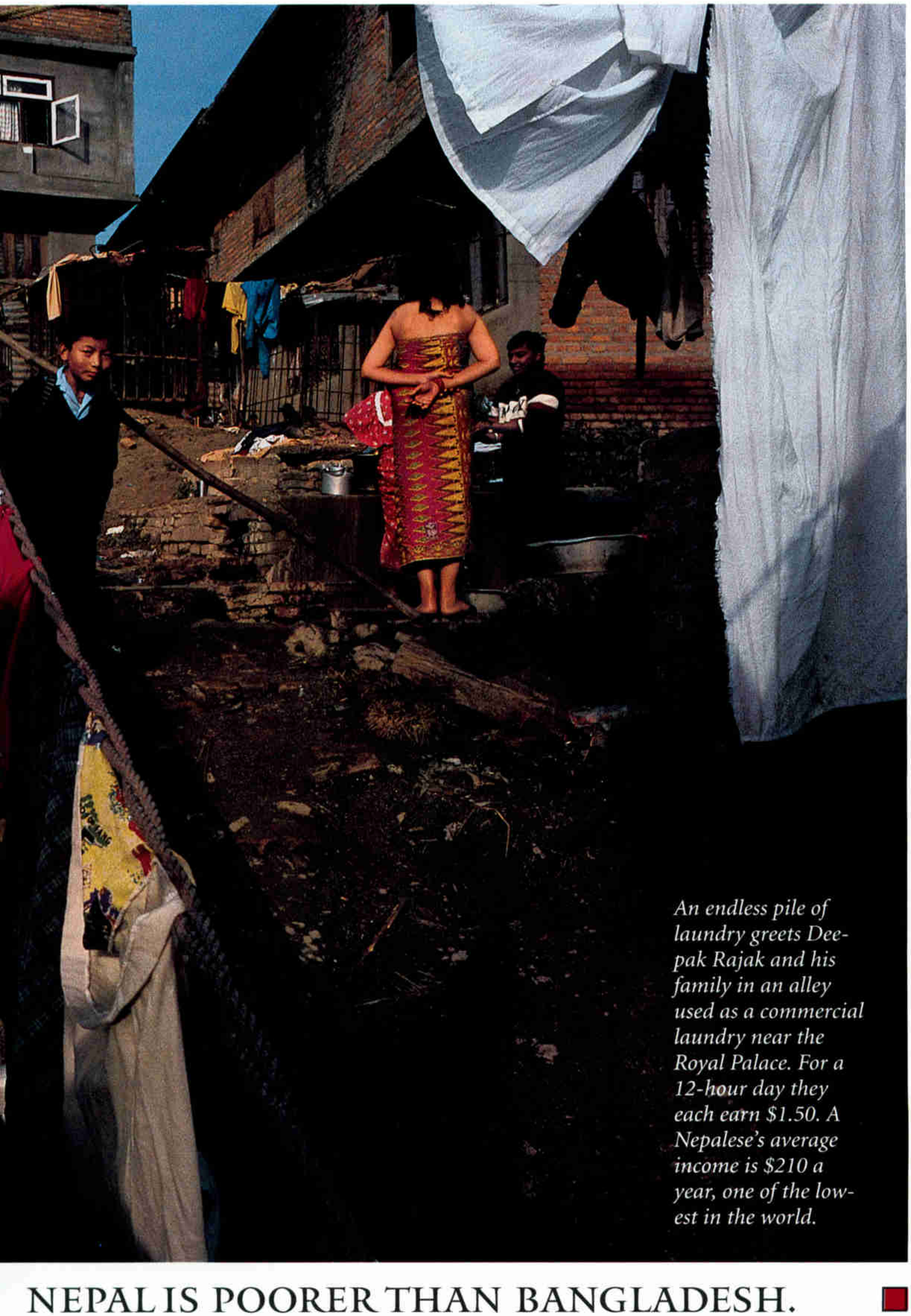




Religion and the caste system permeate Nepalese life. Buddhist pilgrims (top) earn merit by circling the great Boudhanath stupa, while the fierce Hindu goddess Durga demands sacrifices (bottom). Though officially Hindu, Nepal's creeds blend with animism in a spiritual mélange. Descendants of the Ranas (center), whose 104-year reign over Nepal ended in 1951, belong to the powerful Thakuri caste.



IN SPITE OF ITS SHANGRI-LA IMAGE,



An endless pile of laundry greets Deepak Rajak and his family in an alley used as a commercial laundry near the Royal Palace. For a 12-hour day they each earn $1.50. A Nepalese's average income is $210 a year, one of the lowest in the world.

NEPAL IS POORER THAN BANGLADESH.

"MY PARENTS WERE BORN IN THE MIDDLE AGES. MY SON BELONGS TO THE 21ST CENTURY. ONLY MY LIFE SPANS BOTH."

planetes, to describe the "stars" they saw changing position every night. Nepali is an Indo-European language. It thrilled me that, linguistically, Nepalese and I belonged to the same family. When I counted in Nepali, I recited numbers Caesar might have recognized.

TODAY NEPAL has MTV, CNN, e-mail. *Bikas*—Nepali for "development"—has brought other changes too. "I have to watch my blood sugar all the time," Bishnu says as we drive around Kathmandu. Bishnu was 28 and I was 22 when we first met. Now in his vigorous 60s, he's already lived longer than his parents. But Bishnu's body epitomizes what in my Peace Corps days we called "dilemmas of development." Though modern medicine has saved millions, including him, from diseases that once killed many Nepalese before they were 40, development has unleashed new epidemics. In bodies accustomed to climbing mountains, office jobs and changes in diet can cause a person's insulin to run wild.

Bishnu's SUV is air-conditioned; the radio sound system is stereo. What's significant, however, is how Nepalese use the new technology to speak their minds in ways recently unthinkable. "Today's subject is spouse abuse," a talk show host announces. "Our topic next time will be child labor."

In Kathmandu we see sights that, whether grotesque or gratifying, were simply unimaginable not long ago. We see plastic garbage. (We both can remember when plastic was such a rare substance in Nepal it never would have been thrown away.) We see farm-raised fish for sale, also spinach, apples. Kathmandu has pollution that makes your lungs retch and—this amazes me—traffic jams. I'm also amazed, and pleased, by what you no longer see: harelip (now repaired by surgery) and goiter (iodine is now put in the salt).

Another innovation: It is now possible to observe Nepal's scenic wonders by balloon. We take off near Bhaktapur, at the eastern end of the Kathmandu Valley. Once aloft, the Himalaya embrace us like a dream of eternal serenity and cleanliness—the Nepal of the tourist posters. Below, in the Nepal where people actually live, the pollution billows lacy as ocean mist, as we observe the valley's transformation into a heavy-aired cauldron of urban sprawl. The adventure ends with my nearly being strangled. One of the balloon's steel cables twists itself around my neck as we slam into a potato field. The near crash landing was necessary to avoid hitting an electric power line.

Bikas—in this case electricity replacing lanterns—has nearly broken my neck, just as it threatens Bishnu with type II diabetes. Villagers gather round, fascinated by this spectacle of foreigners falling from the sky. While I sop blood from my neck, Bishnu describes the time he first saw foreigners descend from the sky, soon after he made his snowball.

"We had heard that airplanes existed but never seen one," he says. Tens of thousands of people, tense with excitement, converged on a pasture near Pashupatinath, Nepal's most sacred Hindu shrine. Eyes searched the sky.

"The airplane came down from the sky. People got out of it," Bishnu remembers. His parents never saw an airplane or watched TV. Now jets are stacked over the Kathmandu airport, and for Bishnu's children flying is as unexceptional as watching TV. Bishnu is both the boy who didn't know snowballs melt and the man with an e-mail address. So wonder lingers as Bishnu describes that first airplane—wonder that people and machines, not gods and magic, caused it to fly into his life, changing Nepal for good, for bad, forever.

Before the airplane Nepal wasn't "underdeveloped." It was an advanced medieval society into which modern times intruded as if out of nowhere. Since then Nepal has reversed textbook notions of development. In sleet-lashed ravines on the Himalayan plateau, in floodplains in the southern lowlands, technology starts with the airplane and only later advances to the tractor, the telephone, the road.

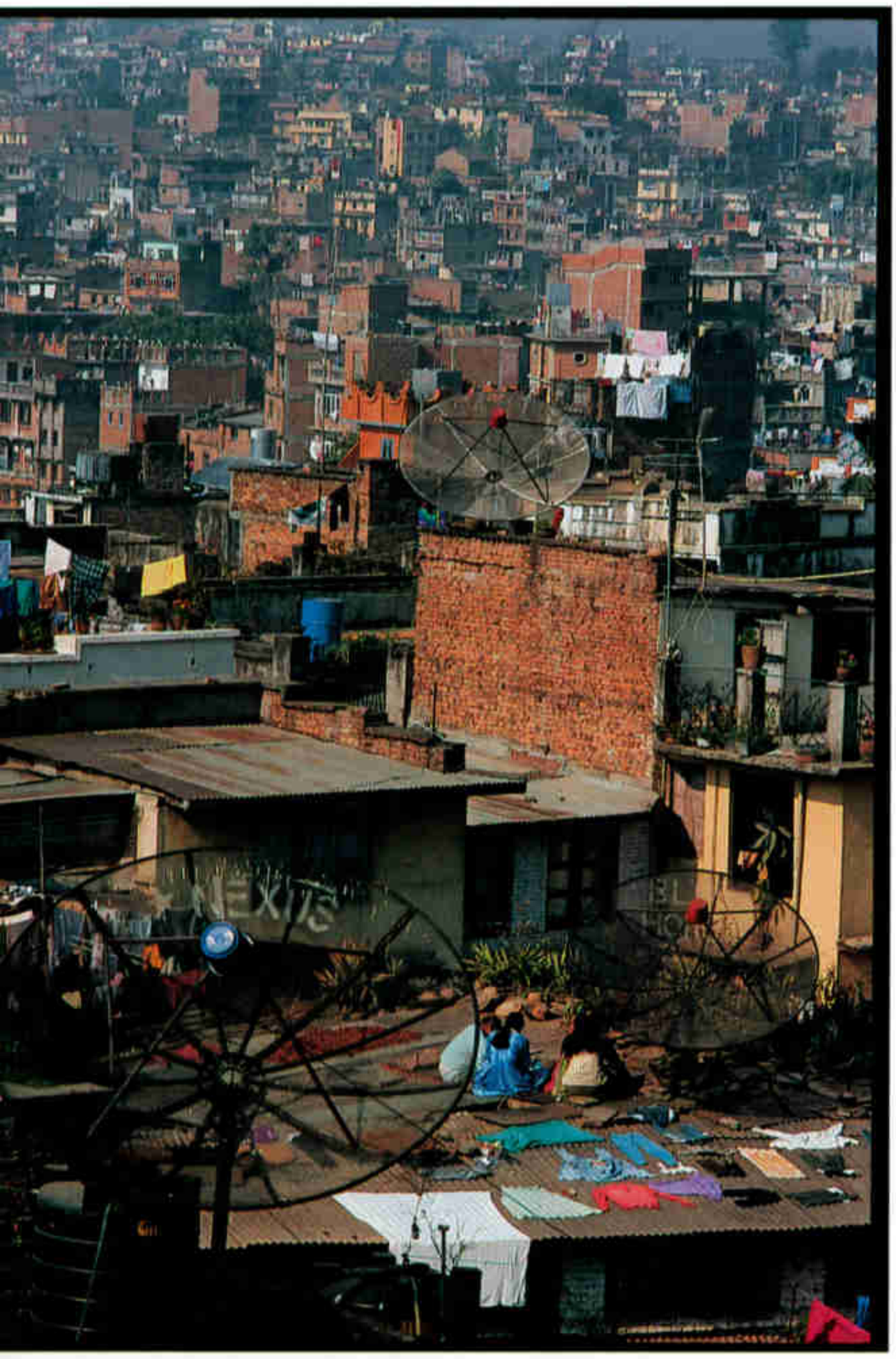
The first airplane landed in Nepal in 1949, but it was seven years later before the first







Prithvi Narayan Shah, first king of Nepal, called his realm "a garden for all types of people," including some 60 ethnic groups. Few had more influence than the Newars, who were renowned for their art and architecture. In Bhaktapur a Newar (top) wears topi *and* khasto *for a morning stroll. Nearby a child plays while her mother works in a brick factory. A Newar girl (left) visits Swayambhunath, Nepal's oldest Buddhist stupa.*



highway connected Kathmandu to the outside world. In remote western Nepal, which I got to know in the 1960s, people heard the Beatles on battery-powered tape decks before they saw electric lights. Helicopters fluttered into their lives long before the first trucks got there.

Within a year of that first landing, the Rana autocracy was overthrown with the aid of an airplane. The Rana prime ministers had kept Nepal's kings virtual prisoners, using the kings' divine status to legitimize their own rule. But what happens when Hindu god-kings as well as mortals can literally fly away?

A family takes rooftop tea above the fray in the heart of Kathmandu. The once rural valley, home to 1.6 million, is now threatened by sprawl. Urban populations may double in the next decade. Such growth has led to some of the worst smog in Asia and pushed farmers to fertile lands to the south, beyond steep hillside terraces like these near the town of Nagarkot (opposite).

In November 1950 King Tribhuvan of Nepal, like a bird escaping a cage, flew off in an airplane—and returned only on condition that, in the king's own words, "the government of our people be carried on henceforth according to a democratic constitution." Today Kathmandu's Tribhuvan International Airport bears his name.

King Mahendra, Tribhuvan's son and successor, ruled from 1955 to 1972. Mahendra stymied democracy while opening the Nepalese mind to the strange notions brought into the country by people ranging from drug-leavened world travelers to epidemiologists. King Mahendra lived half in the Middle Ages, half in the future in another way. He and his wife, Queen Ratna, may have been the first Nepalese couple to use birth control. The pills, purchased by Nepalese diplomats, were sent home in the diplomatic pouch. Today oral contraceptives and condoms are available in little shops throughout Nepal.

King Birendra, Mahendra's son and Nepal's present king, inherited his father's royal dictatorship at a time more and more Nepalese people were unwilling to accept the old paternalism. Earlier, popular protests had been co-opted or crushed, but during Nepal's 1990 spring awakening King Birendra faced the choice of accepting fundamental change or being swept away by it.

A helicopter pilot who spends time watching action-adventure videos, King Birendra accepted change and so has found himself living, like many of his subjects, through three epochs. Once an absolute monarch, he is now a constitutional monarch. It's as though Elizabeth I became Elizabeth II in one reign.

Bishnu's role has also reversed itself. When we first met, he was a novice bureaucrat in King Mahendra's autocratic ruling system, which was specifically designed to prevent average people from electing their own national representatives. Power flowed from the top down. The king's word, not the will of the people, was sovereign. Now Bishnu heads the country's independent electoral commission; his duty is to make sure that the voice of every Nepalese, however poor or humble, is heard.

One time, when we were discussing election logistics, Bishnu's face acquired a brooding look. "I'm figuring out how to get enough



ONCE NEPAL ITSELF SIGNIFIED ESCAPE. NOW IT PROVES THERE'S NO ESCAPING THE DILEMMAS OF OUR TIME.

indelible ink for 12 million voters." He explained: "Most voters are illiterate, so you can't use signatures to tell who's cheating. You stain their hands. That's how you stop fraud."

UNTIL FAIRLY RECENTLY it would have taken weeks to get to Bardia District in southwestern Nepal. Now it's a day's drive from the center of the nation's government. Bardia is in the tarai, the transition zone that separates the plain of the Ganges from the Himalaya, and it used to be *jungli,* the Nepali word for "wild, untamed"—a malarial wilderness. Today in Bardia you go for miles without seeing jungle. Instead you pass yellow fields of blossoming mustard, flocks of cavorting Nepalese children in blue-and-white school uniforms. Bardia is now a kind of sunbelt, where hill people go to seek a new, better life.

When I'd last seen it, in the 1960s, Gulariya, the new capital of Bardia district, consisted of straw shacks. The jungle came right into town. Today Gulariya has the bustle and filth of a thriving bazaar town. Street-stall entrepreneurs hawk cassette tapes, shampoo, soap—even the bars of soap bespeak a revolution. Formerly, people couldn't afford soap. If someone washed with soap, it attracted a crowd.

Here in the tarai, as in the hills, Nepalese are living lives that in many instances no longer have much to do with the old stereotypes of tribe and caste. As Sundar Kumar Thapa, a Magar tribesman, tells me about his life, it's clear he personifies a new generation—the first to grow up in contact with the outside world—the same way Bishnu personifies the last generation to grow up in isolation.

It's a remarkable transformation. The Magar are one of Nepal's dozens of tribal groups—people who once lived with very few life choices, the grandest of which was to become a Gurkha mercenary in the British or Indian armies. (Meanwhile poor Nepalese women populated brothels in India.) In the Nepal hierarchy, power was concentrated in the hands of high-status Brahmans and Chhetris—members of the priestly and warrior castes like Bishnu—along with the Newars of the Kathmandu Valley.

Sundar is a naturalist, white-water rafter, and pop star. "I've won 15 medals in international rafting. My dream is someday to lead a Nepalese team to the Olympics," he tells me. He adds: "I'm also a recording artist."

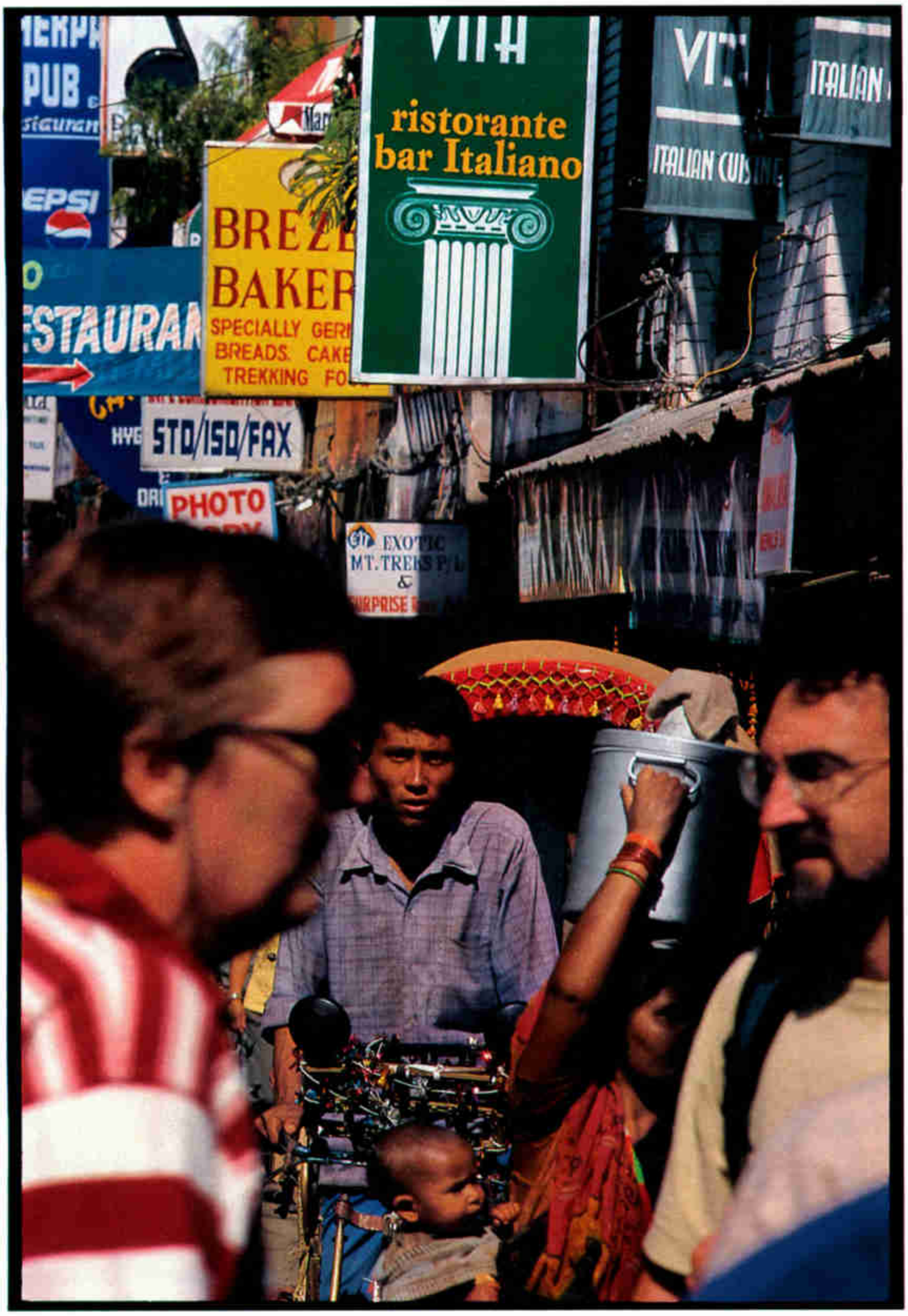
I ask Sundar to play one of his tapes. He sings updated traditional songs in a sure tenor voice; it's Nepalese crossover.

The settlement of Bardia by highlanders like Sundar has become possible as the result of three great changes: the construction of roads, the campaign to eliminate the malaria-carrying mosquito, and deforestation. Until recently the mosquito was the true protector of the elephant, the tiger, the forest and jungle. By impeding human occupation, it stood guard against deforestation and erosion of the hills—and so also was the guardian of the rivers and their unique life-forms, including the gharial and the mugger, Nepal's freshwater crocodiles.

By the time I reached the tarai in 1966, malaria had become something to be eradicated, the tarai something to be developed. Of course, malaria was never eradicated, only suppressed. But that gave mountain farmers time to colonize the lowlands, stripping them of forest. Meanwhile foreign aid donors launched the greatest public works project in Nepal's history: a highway spanning Nepal from east to west. Year by year the road crews struck deeper into the wilderness. Each dry season the East-West Highway crept closer to Bardia.

A theme runs through all this. Once Nepal itself signified escape. Now even Bardia—once so remote—proves there's no escaping the dilemmas of our time. Nepal's role, like Bishnu's, has reversed itself. No longer exempt from the world's complications, the country is now a crossroads where two contradictory themes collide. One is the demand of more and more human beings to live better off what the earth provides. The other is the fact that if we don't take less and give more back, we may become an endangered species too.

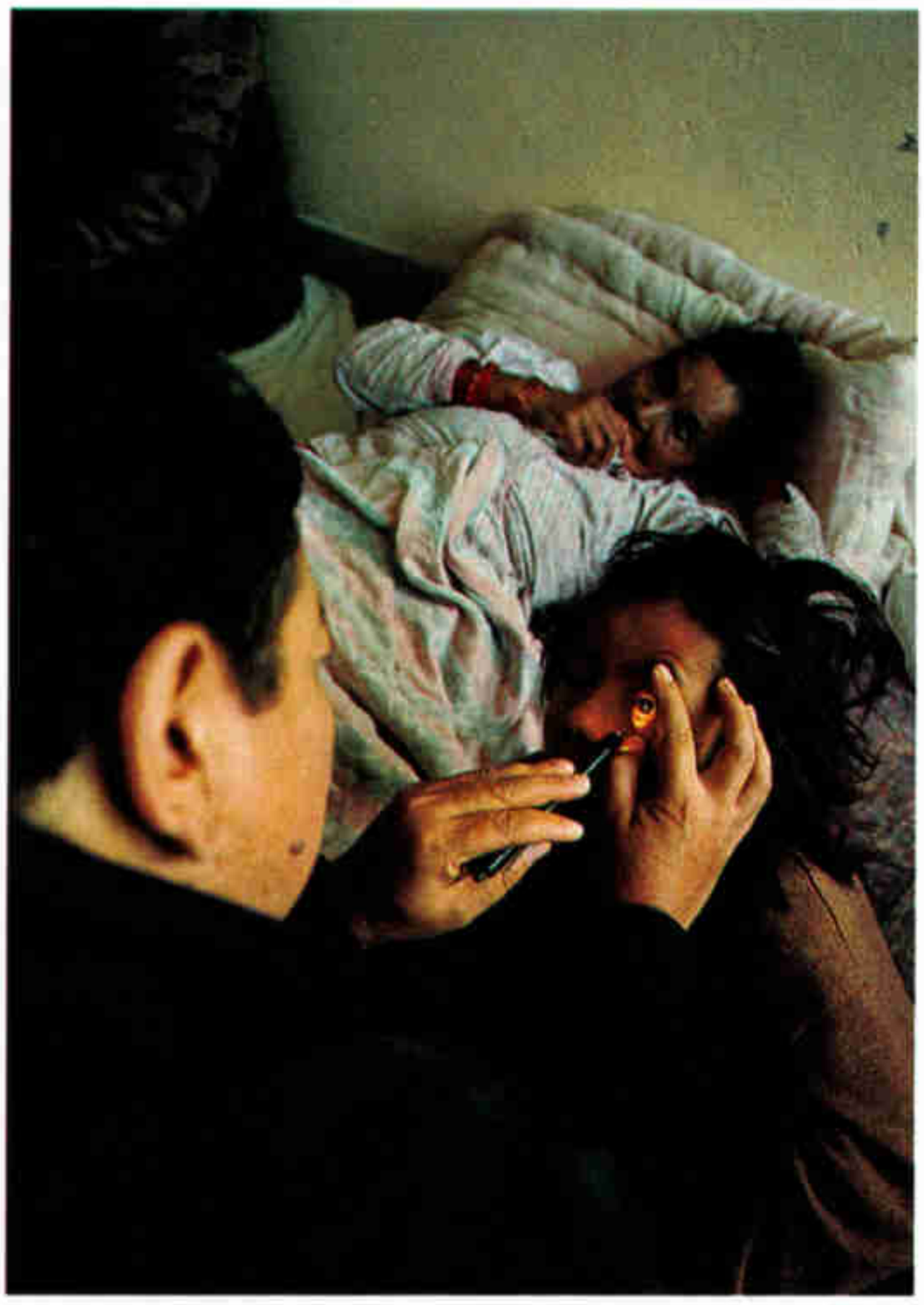
Can ways be found to reconcile colliding





"I'm goin' to Katmandu!" wailed rocker Bob Seger in the 1970s as the city became a magnet for young foreigners looking for an earthly Shangri-la. The flower children have given way to adventure travelers in Thamel (top), the city's tourist quarter. Hindu gods now compete with cuddly babies in the poster stalls. Nearly half a million tourists visit Nepal each year, fueling the economy.

AN EYE ON TWO WORLDS



"You are so brave," Sanduk Ruit tells Seti May Gurung after her surgery in a classroom-turned-operating-room in Bharatpur, a remote village in southern Nepal. The girl, afflicted by cataracts since birth, had walked days to reach the makeshift clinic, then endured shots of anesthetic around both eyes before surgery—with a stoicism far beyond her 12 years. Her reward: 20/60 vision or better.

Cataracts are the leading cause of blindness worldwide, and Himalayan nations may suffer most. In Nepal the condition causes more than 80 percent of curable blindness. The reason the region is so affected is unknown, but researchers suspect genetics, diet, and the intense ultraviolet radiation at high altitudes. Lack of eye care is another factor. Nepal has one ophthalmologist for every 300,000 people.

Enter Dr. Ruit, a soft-spoken Sherpa surgeon who is trying to turn the tide. With the help of the late Australian ophthalmologist Fred Hollows, Ruit perfected high-volume, low-cost cataract surgery that takes less than ten minutes. Some 85,000 Nepalese are treated each year at Ruit's Tilganga Eye Centre in Kathmandu and at remote field clinics like the one in Bharatpur. The poor get the surgery free, while the rest pay on a graduated scale up to $100.

Before Ruit's arrival, most Nepalese received 1940s-era operations that left them dependent on thick glasses, like the homemade monocle held by a crippled man awaiting screening (top right), who was carried to the school by friends. The clinics draw hundreds from the countryside, and they often queue up for blocks.

"It was very difficult in the beginning," says Dr. Ruit. "But after 15 years we have a system so simple that it can be done in remote areas at very low cost without compromising quality."

Relatives and medical students can watch the procedure on a TV monitor connected to the surgical microscope (right). But they'd better not blink—Ruit once performed 101 perfect surgeries in one day, an unofficial world record according to ophthalmologist Geoffrey Tabin. "Ruit is a fantastic technical surgeon," says Dr. Tabin, head of the University of Vermont's Himalayan Cataract Project, which supports the clinics. "He works tirelessly for the poor. The Tilganga Centre sees all comers."

Most who come leave with a better view of life. As one 63-year-old Tibetan woman told Tabin after surgery, "There is a new sky for my eye!"



realities? At the Royal Bardia National Park, naturalists aim to reestablish a long-vanished natural balance. Here, in 1986, the rhinoceros was reintroduced into the western tarai; the animals were trucked in from their last remaining habitat in Chitwan, 200 miles away.

It is a moving sight, at dawn, as the yellow-orange mist evaporates, for Sundar and me to observe from the back of our she-elephant, Laxmikali, the rhinos prospering in their old stomping ground. Yet once again what starts as an adventure turns into a death-threatening encounter. An angry bull elephant bellows and starts charging our elephant, backing us toward a ledge above the Karnali River.

Each time the bull prepares to charge, Par-



desi, our mahout, waits until just the right moment, then beans him between the eyes with a stick, while shouting obscenities at him in Nepali. "He steals our food; he breaks our fences," Pardesi whispers, beads of sweat standing out on his neck. "He is *badmas*, no good."

What is it about this trip to Nepal? I ask after we escape. Bikas is the answer. Electric pylons in Kathmandu, creating more and worse hazards for a hot air balloon. And here in the tarai, roads bringing settlers into elephant lands recently almost pure jungle.

Counting on the future, a student tackles a math problem in one of Kathmandu's antiquated primary schools (above). Male favoritism and family chores keep most girls at home, leading to a female literacy rate of 25 percent—less than half that of males. Boarding school students in Nepalganj fare better, with lights and computers providing a window on the world.

Despite the intense tree cutting in the tarai, Nepal now may actually have more forest than it did a generation ago. Millions of new trees cover the hills around Kathmandu, which were bare during the Rana period. This rebuts the notion that Nepal's environmental problems began with the end of its isolation.

In recent years responsibility for Nepal's forests has been decentralized. Even in the tarai, signs are promising. "When the forest belonged to the nation," a community leader in Gulariya tells me, "the forest belonged to no one. Now that the forest belongs to us, we make sure no one kills the trees."

This is a startling change in Nepal: that local people now have real power to use and abuse. They can clean their streets or steal money—preserve their heritage or let it be gobbled up. Bardia poses the question, Can Nepal's forests be saved for the benefit of its people? Bhaktapur—the Kathmandu Valley's third city—asks the question, Can Nepal's cultural heritage be saved for the benefit of all?

Bhaktapur is full of artistic and architectural marvels, so many that the United Nations has designated the city a World Heritage site. Yet these treasures, including Bhaktapur's five-tiered pagoda, Nepal's tallest, have suffered increasingly from neglect and environmental degradation. In response the city council has adopted a strategy to reverse the degradation, in contrast to Kathmandu, where uncontrolled growth has produced foul air and noisy, congested streets. In Bhaktapur the internal combustion engine is banned from the city's historic heart, and the old stucco and wooden houses are being preserved instead of torn down to make way for new concrete boxes.

In Bhaktapur I saw—and heard—something that moved me deeply. Near the pagoda, I heard the click of glass against glass, and then the laughing chatter of young boys as they played marbles in Durbar Square. It was a sound I had forgotten, which brought back in a rush the Nepal I had originally known: the sound of children playing in streets free of the racket, and danger, of passing trucks.

Are we better off with the plane and without the mosquito? How many of us would be alive to ask such questions if it weren't for vaccines that helped create the population explosion and the machines that pollute our air?



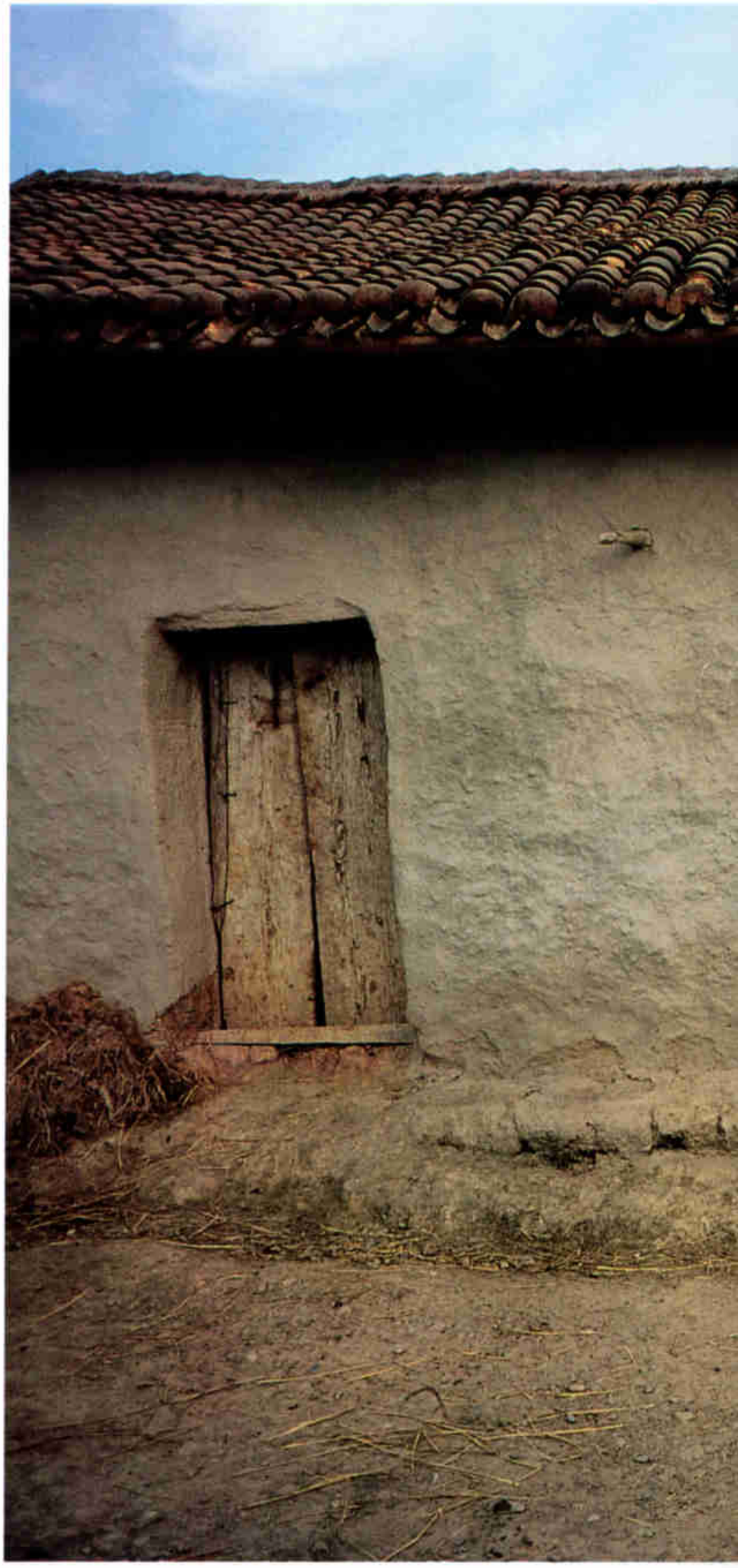
NEPALESE NO LONGER FACE THE LACK OF CHOICES BUT THE BARBED POSSIBILITIES OF MODERN TIMES.

Often, while considering the questions Nepal poses, I think of the postman. I saw him more than 30 years ago when Bishnu and I were trekking up into the hills north of Surkhet. I remember his toes and his trident—a long iron trident, which functioned as marching stave, weapon, and symbol of office. I was struggling up a hill—the Nepalese call them hills, even when they're 11,000 feet tall—and he strode past me as though this steep, dangerous trail were flat. He wore a *topi,* the Nepalese cap, and flared khaki Gurkha military shorts. His postbag was slung over his back. He probably couldn't read the letters he was carrying, but you could tell from the character graven in his face that you could trust him with an envelope containing a million dollars. In his care it would reach its destination safely, no matter how many weeks or months it took him to walk there.

The postman strode up those mountains barefoot. His calloused feet, broad and powerful, reminded me of a quarterback's shoulders. Most extraordinary were his big toes and how skillfully they negotiated the boulders and slippery gravel. They seemed to have an intelligence of their own.

Sometimes, when I hear people talking about Nepal as though it were a postcard, I think that the Nepal I've known all these years must be invisible. This invisible Nepal isn't the land of Sherpas helping stockbrokers scale Everest at $60,000 a pop. The Nepal I know is exactly what Bishnu said—a country that has gone from the Middle Ages to the new millennium in one lifetime. Nepal no longer is the medieval country Bishnu knew as a boy, bountiful traces of which still existed when I got there. Nepal is a very poor, not very successful Third World country.

Just like us, Nepalese now live in a world where there is no turning back; the great life dilemma of Nepal is no longer the lack of choices, the absence of life alternatives. Instead Nepalese, like us, face the barbed possibilities



Nepal has been called an "impossible phantasmagoria"—a land of harsh realities infused with the surreal. Like a young Tharu girl perched on a support post of a traditional longhouse in the remote Dang Valley, Nepal seems to levitate between East and West, past and future.

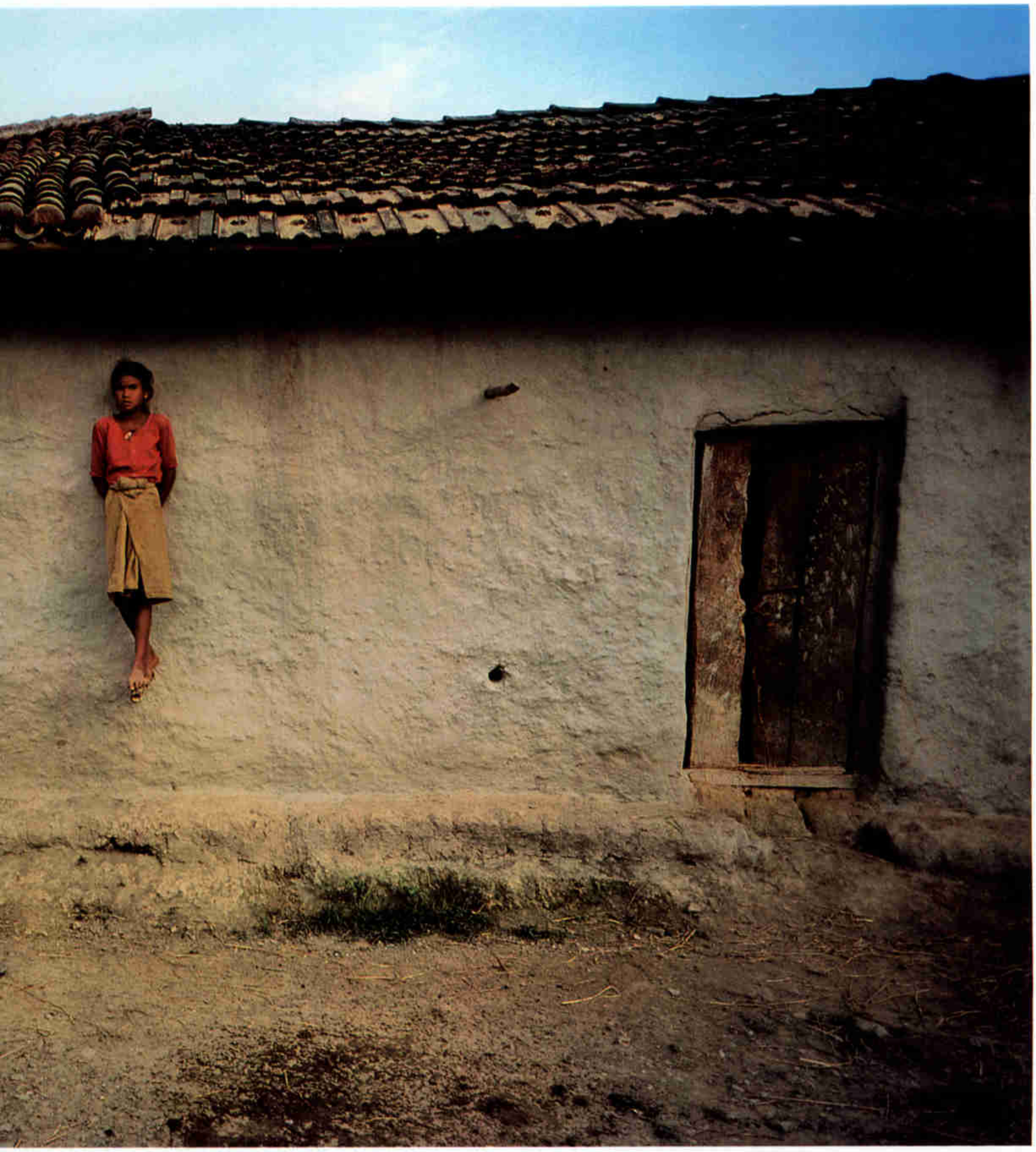
of modern times. Openness to the outside world, but at what social and environmental cost? Freedom—but freedom to do what?

This is the future of Nepal, if it is to have any future other than paradise lost: Growing enough food in the tarai. Reforesting the mountains. Cleaning up Kathmandu. Some tourism and textiles. Hydroelectric power and computers if possible. People power everywhere possible. Much less corruption. Above all, education.

The Nepal of the postman will never come back because, as every Nepalese tells you, the Nepalese people do not want the past back. But still I see him as I glimpsed him then, striding up that hill with his trident: emblem of a Nepal that, while not entirely disappeared, keeps receding, higher and higher, into the Himalayan mist. □

MORE ON OUR WEBSITE

Traditional culture vs. development: Air your opinion and check out our resource list on Nepal at **nationalgeographic.com/ngm/0011**.



Pueblo Ancestors

By CLIFF TARPY NATIONAL GEOGRAPHIC SENIOR WRITER



Return Home

Photographs by IRA BLOCK



The remains of more than 2,000 Native Americans are reburied some 80 years after removal from their graves.

Reflecting on an emotional day, Pete Toya pays homage to his tribal ancestors. War chief of the Jemez Pueblo Indians, he presided over the reburial of the remains of 2,067 individuals at New Mexico's Pecos National Historical Park. They had been removed in the early 20th century and sent to Harvard University's Peabody Museum. A 1990 federal law enables tribes to recover human remains and grave artifacts taken from ancestral lands. William Whatley, the tribe's archaeologist, petitioned for this single largest repatriation of Native American remains to date. "When I saw them at the museum, it was kind of scary," said Toya. "It was also sad. They were just sitting in boxes against the wall. It brought tears to my eyes. But now I'm so happy that we brought our ancestors back to where they belong."

It is the single largest repatriation of

The long odyssey of the Indian dead began in 1914 when archaeologist Alfred V. Kidder arrived in New Mexico in search of Indian artifacts. Over the following 15 years he orchestrated excavations at the unoccupied Pecos Pueblo, sending human remains, pottery, and other funerary items dating from as early as A.D. 1275 to the Peabody Museums in Cambridge and Andover, Massachusetts. Kidder also found non-Indian remains: He posed beside the caskets of two priests, surrounded by the bones of Indians, buried beneath the steps of Pecos's Spanish mission (right).

The violation of the graves was another sad chapter in the history of Pecos Pueblo, once a thriving village of 2,000 people living in multistory adobe structures. Situated near the river that shares its name, Pecos became an important trading center. Plains Indians brought flint, shells, and buffalo hides to exchange for the textiles, pottery, and turquoise of the Pueblo tribes.

Pecos had grown rich and powerful by the time Spanish colonists arrived in 1598. Yet the newcomers' rapid influence was underscored by their building an adobe mission in 1625. During the Pueblo Revolt of 1680, Pecos Indians killed the local priest and destroyed the mission's church. The Spaniards returned to build another church, whose ruins survive at Pecos Historical Park (right). A ladder leads to a restored kiva, a chamber used mainly for Pueblo spiritual rites. Built next to the mission's convento, or priests' residence, it is a reminder that many Indians tolerated Christianity but did not accept it.

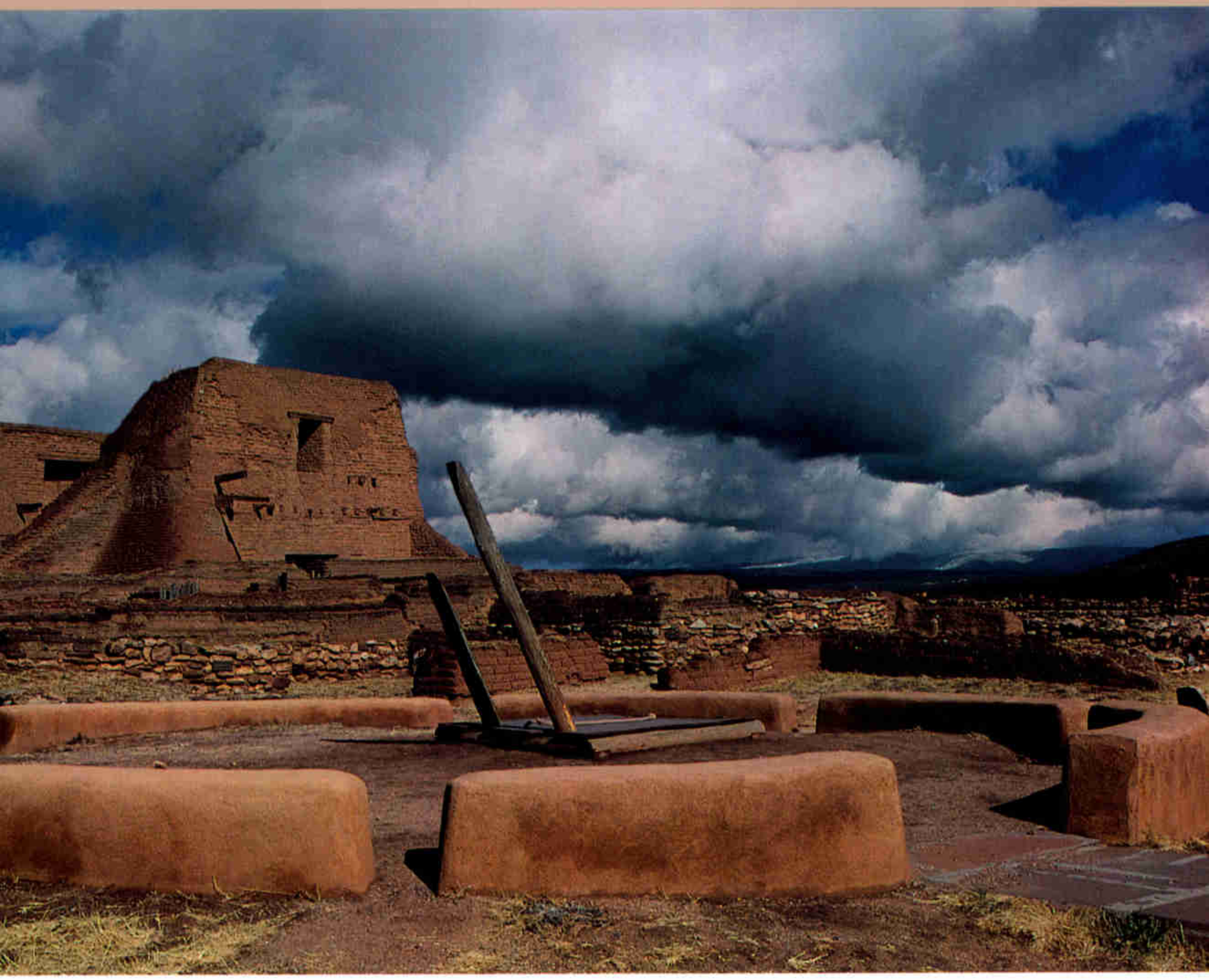
By the 1780s the population of Pecos had fallen to under 300 from raids by Comanche warriors, diseases contracted from Spaniards, and migration. In 1837 Pecos leaders told the governor in Santa Fe, then part of Mexico, of their intention to relocate to Jemez Pueblo. Other pueblos were closer, but Jemez had extended an invitation to the



Image Not Available

MUSEUM OF NEW MEXICO, SANTA FE

Native American remains to date.



diminished tribe. The fewer than 30 remaining Pecos Indians gathered their belongings in 1838 for the 80-mile walk west to their new home. The burials they left behind held pottery that Jemez tribe member Joshua Madalena viewed at Harvard's Peabody Museum in May 1999 (right). Put on a truck, the remains and artifacts were driven nonstop to Pecos.

As the truck left Cambridge, a thousand walkers left Jemez to trace in reverse the path the Pecos immigrants had taken 161 years



Some saw the whirlwind that swirled



toward the mountains as a good omen.



"The Pecos immigrants not only survived





earlier. Three days later the walkers and tribal leaders escorted the truck for the final two miles of the journey (preceding pages). Showing respect for the deceased, Duane Alire, superintendent of Pecos Historical Park, wrapped his badge (above) during the reburial ceremony. A grateful Dolores Toya, whose great-great-great-grandfather emigrated from Pecos to Jemez, embraced her



but flourished with the people of Jemez."



grandson, Tony Sando (left).

The 600-foot-long grave was dug near where Kidder had removed the remains. Freshly covered with earth, it follows a curving swath (above) to avoid disturbing other artifacts. To protect against looters, the site's perimeter is embedded with vibration sensors.

As the ceremony ended, the skies clouded over and the wind picked up. Some saw the whirlwind that swirled toward the mountains as a good omen, signaling that the spirits of the deceased had indeed returned. Raymond Gachupin, governor of Jemez Pueblo, recalled the courage of the Pecos people. "You can only imagine what a heart-wrenching decision that was," he said. "You look back at your village and think about your home, the possessions you had to leave behind." Yet, he said, "The Pecos immigrants not only survived but flourished with the people of Jemez. The Pecos people and their culture are very much alive."

Other remains lie buried in ancestral land that now sits beyond pueblo property, but Gachupin doesn't favor retrieving them. "That's where they lived, where they farmed and hunted," he said. "They're at rest in their home." □

MORE ON OUR WEBSITE

Join our forum board on the repatriation of Native American human remains and artifacts at **nationalgeographic.com/ngm/0011**.

ZipUSA

BEVERLY HILLS, CALIFORNIA

90210



Life Imitates Television

BY LISA BANNON STEINMETZ

PHOTOGRAPHS BY LAUREN GREENFIELD

Let's do lunch. Brad Davis serves drinks at a party hosted by Vicki Walters (in sunglasses). Vicki bought the servers tight T-shirts just for the occasion. Looking good is serious business in Beverly Hills.

BEVERLY HILLS, CALIFORNIA



GERD LUDWIG



90210

POPULATION: 20,488

FIRST MOVIE STARS ON THE BLOCK: Douglas Fairbanks and Mary Pickford, 1920

COST OF GUCCI DOG BED TO MATCH THE SOLD-OUT LUCITE BOWL: $1,490—and the bed is in stock.

NUMBER OF FUNERAL HOMES: None; they're not allowed. Same goes for hospitals and cemeteries.

AGGREGATE INCOME OF THE 2,585 FAMILIES MAKING $150,000 A YEAR OR MORE: $1,177,152,216

"You are way, way too blond," says hair guru José Eber, running his hands through the wispy locks of a distraught customer. "You need to go red."

It's Saturday afternoon inside Eber's Beverly Hills beauty atelier, a vast series of mirrors, lights, and softly whirring blow-dryers that resembles a futuristic spaceship. Eber charges $175 for this 15-minute opinion. If he actually cuts your hair, it costs another $300.

"But I'm tired of orange and red," the woman pouts. "I used to be red, then I went blond. No one can *do* blond." Eber doesn't budge: "I see you red. And your lipstick is all wrong. Are you ready for a major change?"

Eber, who fled the "stifling" style of his native France more than 20 years ago, is wearing a diamond tennis bracelet, a feathered cowboy hat, and a long chestnut ponytail. His first move after arriving here was to borrow the money for a brand-new Rolls-Royce. "It was the best thing I ever did," explains Eber. "In Beverly Hills, if people *believe* you are doing well, then you *are* doing well."

Within this southern California enclave, perception truly is reality. A colorful cocktail of entertainment stars, new money, and year-round sunshine, zip code 90210 gleefully celebrates ostentation. It may not be the absolute richest place in the world, but wealth is probably



Gold standard: Passersby on Rodeo Drive seem to be dressed to match fashion designer Bijan's $300,000 custom-yellow Bentley. It's frequently parked in front of his "by appointment only" boutique.

HAS HEARD YOU

SING

AND HAS NEVER ONCE

LAUGHED.

In fact, your voice could sound like nails on a chalkboard, and your cat wouldn't mind a bit. All he cares about is that you're there for him. And a relationship that special is one worth keeping healthy with Purina O.N.E.® brand Special Formula. It's made with real chicken with no corners cut, and it's complete in every way. Plus, it's low in magnesium and it reduces your cat's urinary pH, which helps to maintain a healthy urinary tract. And a healthy, happy cat is definitely something worth singing about.

How Great Relationships Are Fed.®

www.purinaone.com



©2000 Ralston Purina Company

not displayed with as much sheer exuberance anywhere else. The local Gucci boutique is completely sold out of $750 Lucite dog bowls. Even the Beverly Hills Police Department is in on the act. It's won awards four times since 1989 for its fashionable uniforms. The concern for appearance has kept out the ugliness of modern life; there are no smokestacks, no billboards, no McDonald's.

Most of Beverly Hills is in 90210, and all 90210 mail bears a Beverly Hills address. Locals are thus shielded from the reality that the zip code, possibly the most recognized in the world, lies largely in Los Angeles.

In the north the residential area gently slopes up into the Santa Monica Mountains, where home prices seem to rise with elevation, from 600,000 dollars to 30 million. Here the mansions of the ultrarich are in a constant state of makeover, perpetually evolving into newer, grander expressions of their owners' net worth.

The flatter, palm-lined corner of the zip code in the south is a shimmering mecca of materialism: 300 luxury boutiques, 23 certified plastic surgeons, two salons specializing in eyebrows. "Everything revolves around shopping," says actress Shannon Tweed, a resident, "whether it's for new shoes or a new face."

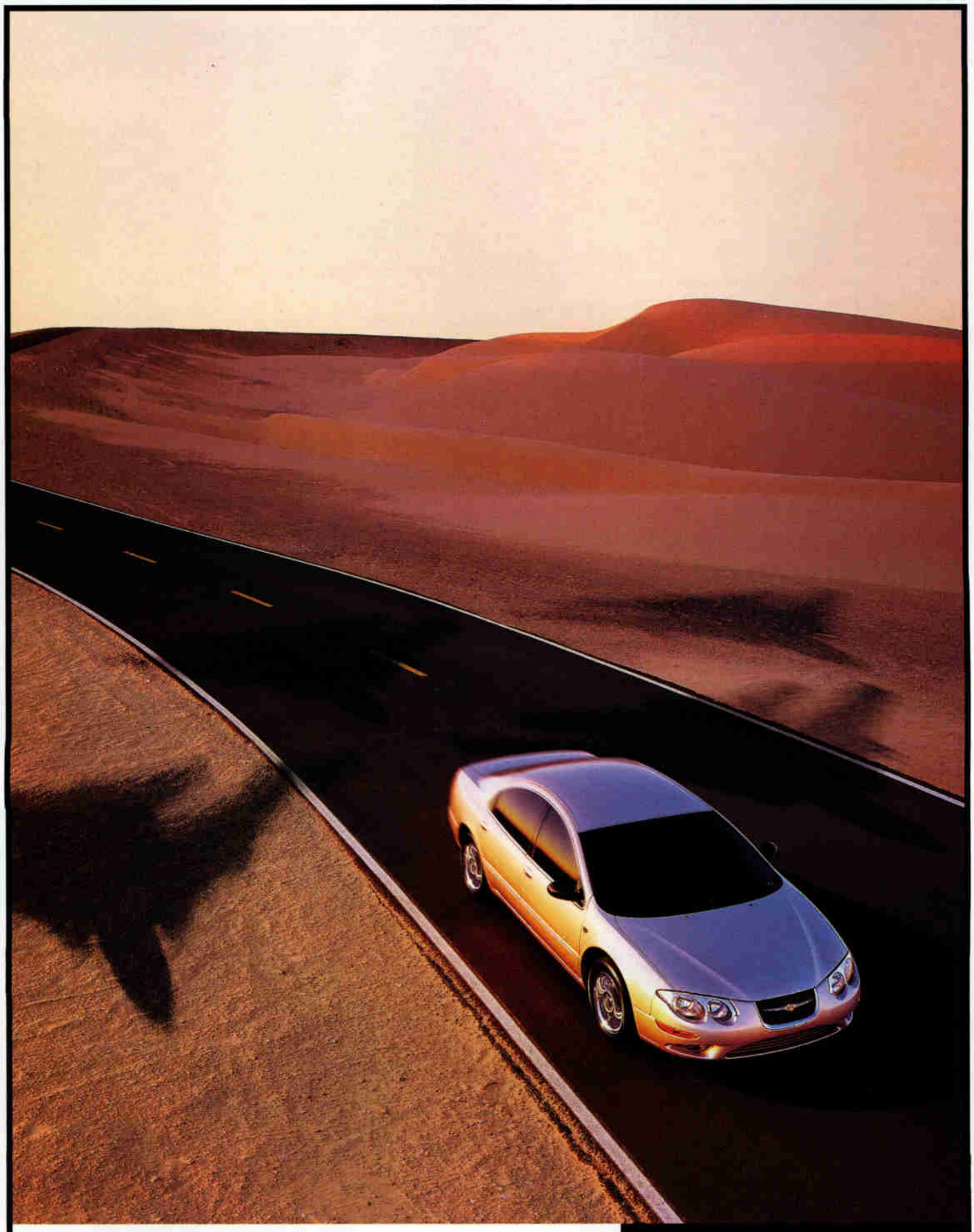
Since it's a 15-minute drive to Hollywood, the entertainment industry has long dominated the town. Today Beverly Hills is home to an eclectic blend of sports stars, business moguls, movie and television celebrities, lawyers, and doctors. Nearly everyone comes from somewhere else.

Frank Ryan, a plastic surgeon, packed up his bags in Toledo, Ohio, after watching an MTV video of Randy Newman's "I Love L.A." Shannon Tweed came 20 years ago from Toronto, Canada, answering a calling to become Playboy Playmate of the Year. Vicki Walters came from Columbia, Missouri, after a protracted shopping trip here. "Back in Missouri there was no Neiman's, nowhere to shop, and our idea of exotic was Taco Bell," says Mrs. Walters, whose husband hit the jackpot in real estate. The Walterses bought Cher's old mansion, adding a moat, a horse ring, and a Moroccan bar.

"In Missouri I cooked every meal—that's normal there," says Walters, a striking



Karina Grinblat tans for big events. Plastic surgeon Frank Ryan injects actress Shannon Tweed with botulinum toxin, a chemical that paralyzes skin-wrinkling muscles.

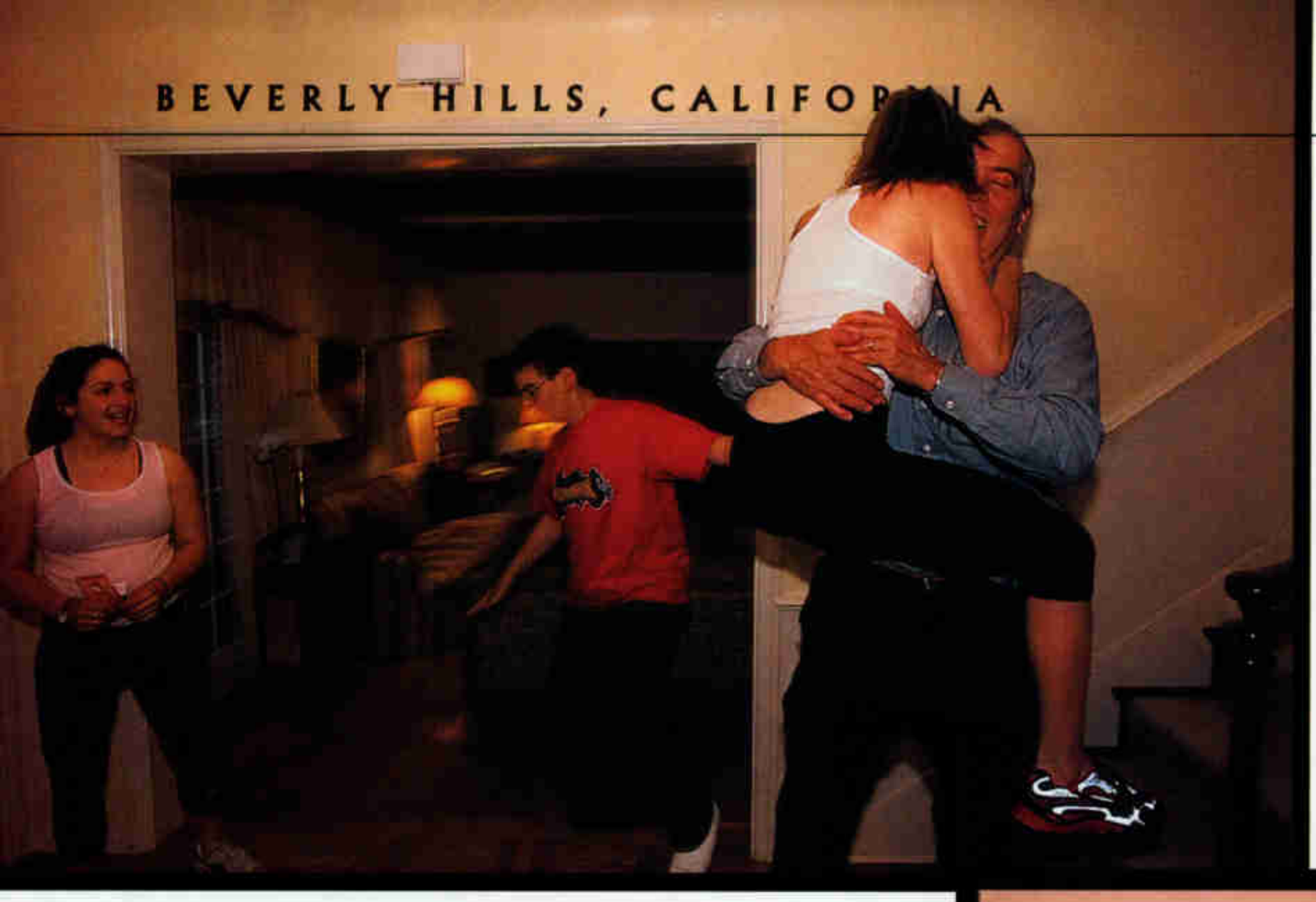


300M

The Chrysler 300M has quite a following. After all, its high-output 3.5 liter 250 horsepower engine makes it the most powerful V6 sports sedan in its class.* 1.800.CHRYSLER or www.chrysler.com

CHRYSLER

*Ward's lower luxury.



54-year-old redhead with the skin of a teen. "Now I have eight gardeners, two maids, and a Moroccan chef. That's normal here."

Enveloped by Los Angeles, Beverly Hills has long battled to ensure its exclusivity. In 1929 Douglas Fairbanks, Sr., even proposed erecting a wall around the city to safeguard residents from the encroaching hordes—a motion narrowly defeated by frantic local merchants.

Yet 70 years later the spirit of Fairbanks's dream is becoming reality. In the northernmost reaches of 90210 builder Brian Adler is driving through a secluded private community, North Beverly Park, where a starter home is eight million dollars. Access is forbidden to the public, and Adler must be waved through a stone gate by a 24-hour security guard. In this cloistered 200-acre sanctuary Adler has constructed 25,000-square-foot Tuscan villas, Venetian palaces, and neoclassical French mansions with a Beverly Hills twist: Many have ten-car garages, several kitchens, and 4,000-square-foot bedroom suites, twice the size of the average American house.

What's happening, Adler explains, is that Beverly Hills has become such an attraction that some of the more affluent residents have grown uncomfortable. Fourteen million tourists come every year, encouraged by city government and the merchants. "All of a sudden tour buses are everywhere, like you're in a Disneyland atmosphere," Adler says.

Now that 80 percent of its revenue comes from businesses, the city is increasingly willing to accommodate tourism, luring national chains such as Banana Republic to crowd in with Tiffany. Nightclubs have opened, even a drive-through pharmacy. Mayor Vicki Reynolds advocates new housing options. "I don't want to say affordable housing," she says carefully, "but more accessible to young professionals."

So more and more of the privileged are retreating behind gates. Vicki Walters, for one, has decided to do most of her entertaining at home. For New Year's Eve she threw an understated, impromptu party: some ham and potato salad, a few select guests, and, at midnight, 500 helium balloons released through the retractable roof of her house. □



Hillary Newman jumps on her dad, grateful for hot concert tickets. Her friend Olivia DeCarlo tries on a dress. Is 90210 teen heaven? Maybe. But it's hard, says Olivia, growing up where "good skin, hair, and clothes" are mandatory.

MORE INFORMATION

ON OUR WEBSITE There's more on 90210 at **nationalgeographic.com/ngm/0011.**

NOMINATE YOUR FAVORITE ZIP CODE at **nationalgeographic.com/ngm/zipcode** or mail your suggestion to PO Box 96095, Washington, DC 20090-6095. E-mail: **zip@nationalgeographic.com**

NATIONAL GEOGRAPHIC®

Take me home...

Call **1.888.647.7301** now to reserve this entire four-poster holiday collection and receive a **FREE** Limited Issue Beluga Whale Print by Nick Caloyianis, or mail in coupon below.*
(Offer good until 12/31/00)

Available now– gallery posters from one of the world's most extraordinary photographic archives.

©2000 NATIONAL GEOGRAPHIC SOCIETY

BIRCH TREES



24 x 34 RG001

Over a century of award-winning articles graced with the work of some of the world's most renowned photographers.

For other collectible offerings, visit **au3e.com** on the Web after 1/1/01.

24 x 34 SW001



RED-EYED TREE FROG

ORCHIDS

32 x 22 MT001



CHEETAH

32 x 24 CJ001



Buy each print for $29.99 unframed, or $59.50 framed in Black Mica. Call now 1.888.647.7301

	UNFRAMED	FRAMED
RG-001	___ Qty @ $29.99 + $ 9.99 S&H /	___ Qty @ $59.50 + 19.99 S&H = $_____
SW-001	___ Qty @ $29.99 + $ 9.99 S&H /	___ Qty @ $59.50 + 19.99 S&H = $_____
MT-001	___ Qty @ $29.99 + $ 9.99 S&H /	___ Qty @ $59.50 + 19.99 S&H = $_____
CJ-001	___ Qty @ $29.99 + $ 9.99 S&H /	___ Qty @ $59.50 + 19.99 S&H = $_____

Unframed $39.98 including shipping & handling Framed $79.49 incl shipping & handling

❑ FREE Beluga Whale Print (with orders of all 4 posters)* Grand Total: $_____

Allow 3-6 weeks for delivery.

Name _____ /Signature _____

Address _____

City _____ State _____ Zip _____

Visa/MC/Discover/Amex # _____ _____ _____ _____ **Exp.** _____

Mail To: NGS, P.O. Box 11303, Des Moines, IA 50340-1303

*Add sales tax in CA, DC, FL, MD, MI, PA – All orders must be in US Dollars. (NG11P)

Final Edit



LIBYA

Uncovering a Culture

An irresistible sight for photographer Reza, nearly a dozen shrouded women, each showing only a single eye, gathered against a flamboyant tent wall to attend a festival in the mountain town of Kabaw. "Because it was a public place, it was a rare chance to photograph women whose Islamic tradition insists that men shouldn't look at women," says Reza. Of the thousands of images Reza shot during his 14 weeks in Libya, "this was one of 20 or so that bubbled to the top," says illustrations editor Bert Fox. "I responded to the patterns, shapes, and colors. It had a lot of punch." Eventually Fox and designer Robert Gray chose a different, more intimate look at extreme modesty: the picture of a cloaked woman alone at the Tripoli airport (pages 4-5). "We decided to go for a theme of solitude and isolation," Fox said. "But both tell an emotional story."

MORE ON OUR WEBSITE

You can send this picture as an electronic greeting card at **nationalgeographic.com/ngm/finaledit/0011.**

BETTER SOUND THROUGH RESEARCH®



BOSE

With enough knowledge, any problem can be solved.

When Bose® began building factory-installed music systems for cars, conventional wisdom believed the automobile environment was much too hostile for true high-fidelity sound. But we embraced the research challenge of developing smaller, lighter, more efficient equipment. Automatic functions. And through it all, far better sound. That knowledge creates better systems for your home, too. Today, the single piece of Bose equipment shown on the left, about the size of a laptop computer, replaces a shelf full of conventional components. Knowledge. It's the foundation of every Bose product.

KNOWLEDGE

To discover which Bose product is best for you, please call

1-800 ASK BOSE

please request ext.T62
or visit us at

ask.bose.com/wt62

For your home. Your car. Your business. Your life.

©2003 Bose Corporation JN00254

ON ASSI

ON THE ROAD, IN THE FIELD,

OPENING

GERD LUDWIG

BEVERLY HILLS

Big City, Small Town

On the road while close to home

She may be a longtime Angeleno, and she may have published an award-winning book about growing up in Los Angeles, but photographer Lauren Greenfield was still surprised by the small-town feel of zip code 90210. "Every day you run into the same people," she marvels, "like the Beverly Hills 'queen of eyebrow waxing.' Everybody knows her."

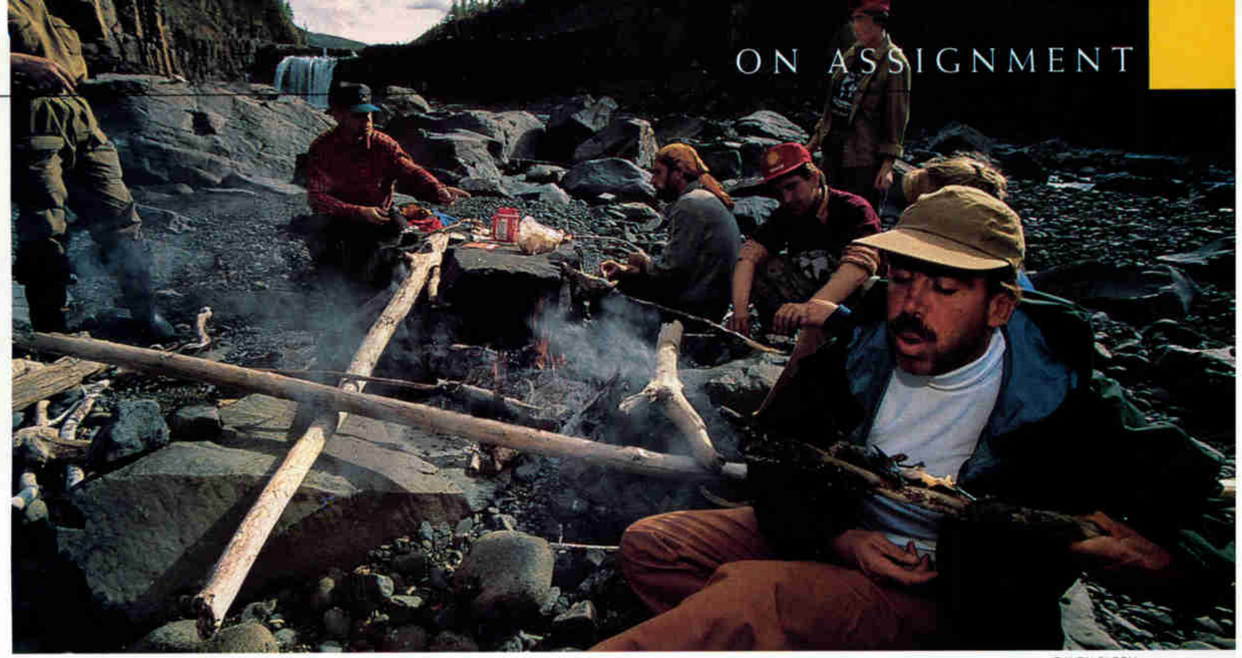
Expecting her first child, Lauren found pregnancy to be a "secret weapon." Photographic subjects were "so open, so easy to get to know." Lauren, here shooting on Rodeo Drive, was still working—answering On Assignment queries via car phone—on the way to the obstetrician a few hours before her son, Noah Francis Greenfield Evers, was born.

AS A PARENT, YOU WANT TO DO EVERYTHING YOU CAN TO KEEP YOUR KIDS FROM EXPERIMENTING WITH DRUGS LIKE POT. IT WOULD BE A WHOLE LOT EASIER IF THEY CAME WITH INSTRUCTIONS. BUT THEY DON'T. WE CAN HELP. SAY THANK YOU. REWARD THEIR EFFORTS. CATCH THEM DOING SOMETHING RIGHT. ENCOURAGE THEM. SMILE. CALL 1-800-788-2800. WE'LL SEND YOU INFORMATION ON WHAT ELSE PARENTS CAN DO. ALSO VISIT OUR WEB SITES AT THEANTIDRUG.COM AND DRUGFREEAMERICA.ORG. YOU CAN MAKE A DIFFERENCE.

PARENTS. THE ANTI-DRUG.



Office of National Drug Control Policy | Partnership for a Drug-Free America®



RANDY OLSON

SIBERIA

Good Dining Abroad

Roasting arctic grayling, which are found in "amazing abundance" in the Putorana Plateau's pristine rivers, writer Fen Montaigne rejoiced at the quality of his fare while exploring the remote and rugged upland. "It was absolutely delicious," says the self-described Russophile, who spent three years as Moscow correspondent for the *Philadelphia Inquirer* and has authored a book on fly-fishing across Russia. Helicopters flew in some food, but the ten expedition members also dined on duck and snipe, brought down with a 1928-vintage shotgun.

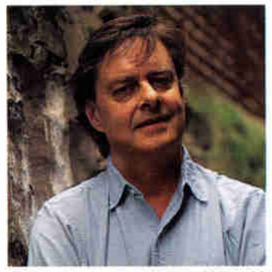
"We ate extraordinarily well," says Fen, "and took turns cooking." His culinary contribution: pasta and tomato sauce.

WORLDWIDE

Nepalese outside Kathmandu greet writer **T. D. Allman** by placing a mark on his brow (below), "the way Hawaiians greet you with a lei," he says. For Allman visiting Nepal meant returning to the site of "the great educational event of my life"—his service with the Peace Corps in the 1960s. "That's when I learned to listen to the ricksha drivers and the peasants," he says. Allman, who is working on a book about Nepal, has been published widely in newspapers and magazines in Asia, the U.S., and Europe.



MAGGIE STEBER



MARK THEISSEN, NGS

History and archaeology have fascinated New York–based photographer **Ira Block** since his school days. Though he has photographed as far afield as the North Pole, he has a special fondness for subjects in the American Southwest, such as the people of Jemez Pueblo. "You're dealing with the first Americans," he says. "That's *real* American history."

Andrew Cockburn (above), a native of Ireland, first went to Libya 35 years ago as a food salesman. Since his career turn into journalism he has covered much of the Middle East in books, articles, and documentary films. On this assignment he "felt like an explorer, given that Libya has been isolated for so long. It has become a land of myth and legend." One regret: He just missed a production in Tripoli of *Waiting for Godot,* adapted, said the director, "to account for local absurdities."

"Luis Marden is a Renaissance man, which few people can claim to be these days," says photographer **Sarah Leen.** In this article "we showcase a different portion of his life and work in each still life." She honed the still-life technique in her photographic coverage for our January 1998 article on Amelia Earhart. Leen began her career behind the camera as an intern at the GEOGRAPHIC and has freelanced for the magazine since 1989.

Wait'll you get your hands on the all-new Caravan.



The most powerful engine you can get in a minivan. *Grand Caravan's available 215 horsepower, 3.8L V-6 has been refined to get you from zero to sixty about 7.6% quicker.*



When there's treachery afoot, you'll appreciate the fact that anti-lock brakes are standard on most models. Along with available traction control.

Easy in. Easy out. Easy choice. *Caravan's available Quad Seats are easily moved. Easily removed. And if you look under your seat, you'll see that we've provided added storage room.*





There are as many as 14 cupholders on the latest iteration of America's favorite minivan. Caravan is everybody's cup of...



Imagine, airbags so advanced they adjust for severity of impact. Our Next Generation multistage airbags do. Front-seat supplemental side airbags are also available, for additional impact protection.[1]



Caravan's Rear Seat Video™ entertainment system will keep everybody happily seated. You might want to ask your dealer to install this option.



Caravan's Quad Seats Fold-and-Tumble.™ The cupholders on the side don't.



The first minivan to offer Three-Zone Automatic Temperature Control. *Infrared sensors read the temperature around the driver, front passenger, and back passengers. And then give each zone its own control.*

Just because you're flying doesn't mean all your bags have to. Check out Caravan's particularly nifty set of hooks. They're really neat.



There's an organizer available for the back.[2] Which can be quickly configured to form up to three compartments. Or folded flat. When raised, it'll accommodate six standing grocery bags.[3]





Torsional stiffness. Aluminum steering knuckles. In other words, we know a thing or two about ride and handling.

The quietest Caravan ever. *You can hold just about anything in it, including a conversation.*



The first ever available movable center console with power outlet. *It moves from front to back. It moves from back to front. Or can be removed altogether. How can you live your chaotic life without it?*



There's a power outlet inside the center console. It's such a great first, why don't you ask your dealer to install a second.



In case of an emergency, make sure you're in the right vehicle. Caravan's available 17-inch tires add stability. And a lot of engineering overhead was utilized to help protect you against serious head injury.



We pushed all the right buttons. If an obstacle is detected, Caravan's power sliding doors and rear hatch are programmed to stop in their tracks.[4] And reverse.

The first minivan ever to offer two power sliding doors and a power rear hatch. *The all-new Caravan has both. You could say, there's nothing else remotely like it.*



What'll we think of first? *It's easy to find out. Click www.4adodge.com for a virtual tour. If it's not the first place you think of, dial 800-4-A-DODGE. We'll send you all kinds of helpful information. An action-filled video. A CD-ROM. Even a catalog. Click or call, whichever comes first.*

All-new Dodge Grand Caravan Different.

The Best Minivan Ever.[5]

[1]Always use seat belts. Remember, a backseat is the safest place for children 12 and under. [2]Ask your dealer to find out when this feature will be available. [3]Properly secure all cargo. [4]Detects most obstacles. As with all electronically controlled systems, care is advised. [5]Based on AMCI overall weighted evaluations of 2001 Grand Caravan vs. similarly-equipped 2000 MY competitors. Call 800-4-A-DODGE for details.

Flashback



ALEXANDER WIEDERSEDER

ZipUSA: 90210

Dog Gone

"An Architect's Roadside Nightmare" read the caption for this photograph published in "Southern California at Work," in November 1934—a sentiment likely shared in upscale Beverly Hills, where the common touch of surrounding Los Angeles was, and is, anathema. Author Frederick Simpich was aghast at buildings shaped like "owls, derby hats, shoes, airships, dogs, teakettles, windmills, mosques, wienerwursts, zeppelins, and igloos."

MORE ON OUR WEBSITE

You can send this month's Flashback as an electronic greeting card and access the Flashback photo archives at **nationalgeographic.com/ngm/flashback/0011.**

NATIONAL GEOGRAPHIC (ISSN 0027-9358) IS PUBLISHED MONTHLY BY THE NATIONAL GEOGRAPHIC SOCIETY, 1145 17TH ST. NW, WASHINGTON, DC 20036-4688. $29.00 A YEAR FOR U.S. DELIVERY, $5.00 PER SINGLE COPY (INCLUDES POSTAGE AND HANDLING). PERIODICALS POSTAGE PAID AT WASHINGTON, DC, AND AT ADDITIONAL MAILING OFFICES. POSTMASTER: SEND ADDRESS CHANGES TO NATIONAL GEOGRAPHIC, PO BOX 63002, TAMPA, FL 33663-3002.

© 2000 BP Amoco p.l.c.

Could business be about more than just profits? Could it be a force for good?

Can a cleaner gasoline be refined?

We think so, and the employees of BP, Amoco, ARCO and Castrol are forming a new company, to try.

Is it possible to drive a car and still have a clean environment?

Can solar power become mainstream?



beyond petroleum

bp

bp.com